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CONTENTS

Tomatoes above Ground, Potatoes Underneath, by C. E. Myers (frontispiece) 530
Southern Strawberries, by George M. Darrow 531
Studies of Inheritance in Guinea-Pigs and Rats (review of a book by W. E. Castle and Sewall Wright) 540
The Tide of Immigration (review of a book by Frank Julian Warne) 541
Pollination Studies on California Fruits 545
An Immigration Policy, by Sidney L. Gulick 546
A Hypothesis of Semi-Sterility Confirmed, by John Belling 552
Pitted Ear Lobes of Congenital Origin, by Albert Ernest Jenks 553
The Mothercraft Manual (review of a book by Mary L. Read) 554
Progress of Eugenics in England 554
Linebreeding, by Richard H. Wood 555
Luther Burbank (review of a book by Henry Smith Williams) 556
Some Sweet-Pea Hybrids 556
The Great Unmarried (review of a book by Walter M. Gallichan) 557
The Fundamental Work on Measurement of Intelligence (review of two books by Alfred Binet and Th. Simon, translated by Elizabeth S. Kite) 561
Mental Effects of Inbreeding in Rats 561
Exceptional Fecundity and Longevity, by Henry M. Jones 562
All Breeders Should Keep Records, by George M. Rommel 564
The Transmission of Rabies 564
Harvard and Yale Birth Rates (John C. Phillips) 565
Prosperity and Eugenics 569
The Association's Annual Meeting 570

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TOMATOES ABOVE GROUND, POTATOES UNDERNEATH

Considerable interest has been aroused by the quite general publication in the press of the country of the grafting of a tomato plant on a potato plant at the Pennsylvania State College, and the institution was credited with the conception of the experiment.

From the widespread interest that has been manifested, it would appear that the idea is a new one, while, as a matter of fact, it has been common knowledge of botanists and horticulturists for many years. The idea did not originate at the Pennsylvania State College, neither is it considered especially remarkable nor of great economic value.

In order to demonstrate the ease with which these two closely related plants may be grafted, one attempt was made, the common inverted "saddle graft" method being used. The plant was wrapped with raffia at the junction of the two pieces and was then placed in a humid atmosphere for several days until the union was perfected. Later the plant was shifted to the outside where little attention was given it. Later tubers developed on the potato part and tomatoes on the top.

The illustration shows the general appearance of the plant, the value of which is inversely proportional to the amount of attention it has received. (Frontispiece.)

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SOUTHERN STRAWBERRIES

Most of the Varieties Grown There Are Due to Skill of Two Breeders—Their Method of Operation—Still Room For Further Breeding

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ABOUT forty years ago a boy named Robert L. Cloud was helping his father grow strawberries in Louisiana for the New Orleans market. The varieties grown at that time had been imported from abroad and from the North. They bore soft fruit and were not adapted to a southern climate. He realized that varieties were needed which would keep better under the hot mid-day sun of the South, and he began trying to breed such varieties.

Ten years later, Robert L. Cloud was the railroad shipping agent at Independence, La., and superintended the shipment of the first iced refrigerator car of strawberries ever sent to the northern markets. This experience enabled him to see just what kind of a berry was needed. With such a training began the career of one of the most successful of American berry breeders.

Mr. Cloud knew the characteristics of all the best varieties previously grown. He picked out some poor varieties that were good shippers and some good varieties that were poor shippers and began to cross them. In 1889 he had already put two of his crosses, Cloud and Big Bob, into the trade and since the time of their introduction the varieties grown in Louisiana, as well as in some other parts of the South, have consisted entirely of those produced by Mr. Cloud.

At the time of the Civil War, the Early Scarlet, a variety very aromatic and similar to wild strawberries, was grown in Louisiana. The Peabody-hoboy was the next to be taken up. Following this in succession were grown the Prince Imperial, a variety introduced from France; Mary Stuart, a pistillate[1] variety; Crescent, another pistillate variety; and then the Wilson. Next came the Cloud and Big Bob, and they were the leading varieties from the time of their introduction until Mr. Cloud introduced the Klondike in 1901. Other varieties, the Lulu and the Pickerproof, were originated by him between 1888 and 1901, but neither proved as desirable as the Cloud and Big Bob.

Mr. Cloud is still at work originating new varieties. In a shaded place in which the seed is sowed are seedlings just showing through the ground. In different parts of his fields in which he raises berries for market are to be found new varieties which he is testing side by side with the Klondike, the standard variety of his section. Two of his new varieties he plans to introduce at an early date. These he calls the Payday and Perfecto.

THE NEWEST IMPROVEMENTS

The Payday is the result of a cross between a seedling used only in breeding work and the Klondike. An inter-

[1] Commercial varieties of strawberries fall in two classes: those with perfect flowers, including both stamens and pistils; and those whose flowers lack the male element, and are called pistillate. It is obvious that if plants of the second type are grown exclusively, the flowers can not be fertilized, and will produce no fruit. Tyros have sometimes planted a bed of one variety—a pistillate one—and have been quite astonished that it yielded nothing, although it flowered freely. The pistillate varieties are rapidly going out of use, growers tending to plant only perfect-flowered varieties in order to avoid this difficulty. The two types of flowers are illustrated by photomicrographs in connection with "Ettersburg Strawberries," by Roy E. Clausen; JOURNAL OF HEREDITY, VI, pp. 324-332, July, 1915.

WHERE MANY FAMOUS STRAWBERRIES ORIGINATED

Home of R. L. Cloud, Hammond, La. In the garden around this house were produced the Klondike, Cloud, and other widely grown varieties. The field in the foreground is at present occupied by Payday, a variety which Mr. Cloud plans to introduce to the trade. (Fig. 1.)

esting characteristic of this seedling used as one of the parents in producing Payday is that on any one plant a few flowers have stamens but most of them have none.

The Payday, says Mr. Cloud, is the best of the two new varieties, and he regards it as an improvement over the Klondike. He reports it to be superior to the Klondike in the number of crowns made by the individual plant, in the vigor of the plant, in having the stems of the berries recurved, in having a darker colored berry, in bearing fruit of better quality, and in having a shorter period between the blossoming time and the ripening of the fruit.

Believing that a large number of crowns in a plant indicates productiveness, he has endeavored to secure a variety having many crowns. One characteristic of the Klondike which helped to make it a success is its rich red color and in his later work Mr. Cloud has endeavored to get seedlings bearing berries of a still deeper color.

Mr. Cloud correlates acidity of fruit with good shipping quality and in his recent work has tried to secure a variety with the acidity of the Klondike. The Payday has a strongly acid berry, but combined with the acidity, a more desirable flavor.

To get earlier ripening varieties, two lines of work have been followed. Some varieties have flower-stems that curve as soon as the petals begin to drop. In a very short time the green berries are protected by the foliage of the plant. Frosts, cold winds, or rains are not as likely to injure berries borne on the recurved stems as on stiff, straight stems. Another way to secure earlier berries is to lessen the period between the

A PERFECT STRAWBERRY BLOSSOM

In the center is a compact mass of pistils, short tubes each of which leads down to a seed. Around these pistils are the stamens surmounted by capsule-like anthers filled with pollen. Usually fertilization takes place through pollen which bees bring from other strawberry blossoms and which brushes off their heads and legs on to the pistils. It is obviously necessary to have some of these "perfect" flowers in the strawberry bed, if fertilization is to take place. But some varieties bear flowers which have no pollen; they are imperfect or pistillate. Unless such varieties are interplanted with perfect-flowered varieties, no crop will be produced. Photograph by John Howard Paine, much enlarged. (Fig. 2.)

time of bloom and of ripe fruit. Mr. Cloud considers that he has succeeded to some degree in combining both characteristics in the Payday.

Like other plant breeders who have had long experience, Mr. Cloud can detect plant characteristics and differences indistinguishable to one lacking

similar training. It is no doubt this ability together with an accurate conception of the requirements of a good commercial variety that has led to his success.

The parentage of Mr. Cloud's strawberries was given by him as follows:

Cloud.....Crescent x Wilson.
Big Bob....Cumberland Triumph x Neuman
Lulu.....Crescent x Neuman.
Pickerproof .Lulu x Hoffman.
Klondike....Pickerproof x Hoffman.
Payday.....Unnamed seedling x Klondike.
Perfecto....Unnamed seedling x Klondike.

THE WORK OF LOUIS HUBACH

Another very successful strawberry breeder in the southern States also began his work when only a boy. Louis Hubach, to whom I refer, made his first cross-pollinations when he was 14 years old. That was in 1886, and he is still making them.

He was born in Prussia on June 15, 1872, and came to this country when he was 9 years old. His father, a nurseryman, both in Germany and after coming to this country, trained him in the nursery work, and since his father's death he has run a small nursery of his own at Judsonia, Ark.

In addition to managing the nursery, Mr. Hubach has been a grower and breeder of strawberries. When only 20 years old, he originated the Excelsior, the best known of all his varieties. This was introduced in 1897, and is still the standard berry of its season in the South as well as in some parts of the North and West.

Mr. Hubach's first cross was the Crescent x Chas. Downing. From this he secured the Bush Cluster, a pistillate variety used in his later breeding work. In 1892, he secured both the Excelsior and the Hathaway (also called Early Hathaway and Texas), as the result of a cross between the Hoffman and the Wilson. In 1893, he originated the Fremont Williams (Bush cluster x Gandy), a very late variety which is proving to be desirable in the extreme northern part of the eastern United States.

The Hathaway and Hubach were introduced in 1902. In 1903, other varieties originated by Mr. Hubach were introduced under the names, Arkansas Black, Annie Hubach, Early Market, Peerless, Alice Hathaway, Mellie Hubach, Sunny South, Oscar's Early, Ford, Minnie, Evergreen, Maggie Watts, Carrie Dumas, Myriad, Brundidge, and Johnson's Early. Of these Mellie and Early Market are still grown commercially to a slight extent.

Later Mr. Hubach originated the Eureka which he sold to the Judsonia Fruit and Vegetable Growers' Association. Although still grown it did not prove to be as good as standard varieties. Other varieties introduced by him are the H & H, Benancie, Newman, Wide Awake, Mountain View, Alvin, Early Harvest, Jim Dumas, and Champion K. The Champion K is his most recent introduction and is a cross between a pistillate variety and the Klondike.

Mr. Hubach uses only pistillate varieties as mother plants in breeding. His experience has been that when he has crossed perfect-flowered with perfect-flowered varieties the progeny lost in productiveness. In an experiment in which he tested this, he found that the decrease in yield continued for several generations. On the other hand, when an imperfect-flowered variety was used as the mother plant, an increase in productiveness often occurred.

Because of this experience, Mr. Hubach developed several varieties having imperfect flowers which are used in breeding only. One such variety with very firm fruit seems to be able to transmit this firmness to all its progeny. Others of these varieties are used when other characters are desired in the seedlings.

Mr. Hubach's breeding methods are interesting. He grows, in a separate plot, four plants of each pistillate variety which he wishes to use. At the beginning of the flowering period, he encloses the four plants in a wooden frame covered with a white cloth of fine weave—preferably silk cloth. When a cross is to be made, a flower from a plant having perfect bloom is picked early in the morning and is placed in an inverted position on one of the flowers

REPRODUCTIVE ORGANS OF THE STRAWBERRY

In the above photograph a portion of a perfect flower has been cut out and highly magnified. The pistils terminate in rough, sticky surfaces, to which a falling grain of pollen readily adheres. It soon begins to germinate, and sends a long tube down the pistil, until it reaches the base where the ovule is located. The nucleus of the pollen grain slips down the pollen-tube and unites with the ovule, thus completing the fecundation of this particular seed. Every pistil must receive a grain of pollen, if all the seeds are to grow. Photograph by John Howard Paine. (Fig. 3.)

under the cloth frame. Pollen falls on the pistils and fertilization takes place.

Seed from the resulting berries is collected, cleaned, and kept one year. Mr. Hubach says that the weaker seed is killed by being stored while the good seed starts better. It is then soaked in water for three days and planted about the middle of May in sterilized soil composed of half sand and half well-rotted stable manure. The seed usually germinates readily and the young plants appear in three or four days. They are grown in a lath house under two-thirds shade and are watered carefully with a fine spray. When the plants have three or four leaves, the ones with undesirable characteristics are discarded. Correlation of characters makes it possible to discard most of the undesirable ones at this time.

The year after that in which the seed was planted, fruit will be borne. From among the seedlings thus produced, Mr. Hubach selects the one nearest to his ideal. If it lacks some desirable character he crosses it on the one of his pistillate varieties which he has found will supply the missing character. From the resulting seedlings he expects to secure his ideal.

Following the plan outlined, Mr. Hubach has been working toward an ideal variety for each season. Thus he has attempted to secure a variety with the desirable characters of the Klondike, but better in certain respects. Such a variety he considers the Famous to be. It ripens two weeks earlier than the Klondike and slightly earlier than the Excelsior at Mr. Hubach's place. The berries are similar to the Klondike in shape and color. They are slightly larger than the Klondike and run very uniform throughout the season. The berries are borne on long stems with one berry to each stem to a greater extent than are the berries of the Klondike. Mr. Hubach believes that a variety bearing a large proportion of its fruit on such individual stems coming from the crown of the plant will yield berries of more uniform size through a long season, and he is, therefore, breeding for a variety which shall have a stem for every berry.

If the Famous proves generally as productive, firm, and free from diseases as it has on Mr. Hubach's place, it should be a valuable addition to the list of varieties for the South.

Mr. Hubach is trying to produce a variety as late as the Aroma but with the desirable characteristics of the Klondike, and which may be grown with the Klondike or Famous. Such a variety Mr. Hubach considers that he has originated and he is testing it on a commercial scale.

He has not found northern varieties suitable for use in breeding work as the berries are too soft for long shipments. A firm berry is absolutely necessary for southern growers. Until two years ago, Mr. Hubach maintained a collection of strawberries in which he says there were about 2,200 varieties. He found it too expensive to maintain and destroyed it. From a study of the collection, however, he secured a broad knowledge of the material available for use in breeding. The collection was undoubtedly by many times the largest collection ever brought together in America.

OTHER STRAWBERRY BREEDERS

I have described the work of these two men in some detail so that any one else who wants to try strawberry breeding may know how it has been done with great success by others. Some of the other Southerners who have contributed to the great development of the strawberry industry in the South should also be mentioned.

J. C. Bauer, of Judsonia, Ark., has originated and introduced the St. Louis and the Gold Mine. The former is a very productive early variety suitable for home use and local market, but rather soft and light colored for the general market. The Gold Mine is a late variety too recently introduced to have its value determined. Mr. Bauer is still trying to secure better varieties.

Other men have found seedlings growing near packing houses, in the woods, by the railroad track, or in other places where seed chanced to germinate.[2] In this way, W. W. Wallace, of Harriman, Tenn., found the Three W and other varieties; D. C. Tibbs, of Nashville, Tenn., found the Champ Clark and the Nicaragua; Mrs. David Thompson, of Mt. Olive, N. Car., the Thompson (Lady Thompson); V. S. Babcock, of Norfolk, Va., the Jamestown; Nathaniel Gohn, of Norfolk, Va., the Missionary; Caleb Price, of Mt. Olive, N. Car., the Price; Mr. Murray, of Magnolia, N. Car., the Murray; Mr. Faison, of Faison, N. Car., the Dixie (Dixie Belle); R. G. Thomas, of Greensboro, N. Car., the Greensboro; and Geo. Mitchel, of Judsonia, Ark., the Mitchel.

Thirty years ago there were practically no strawberries shipped out of

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[2] Bud variation seems to have played little part in the recent improvement of the strawberry. The only instance on record is the reputed appearance of the fall-bearing or ever-bearing strawberry, the first variety of which (Pan-American) was introduced from Delevan, N. Y., in 1898, and was said, although without definite proof, to be a bud sport of the summer-bearing variety Bismarck. Some plants of the variety Missionary in Florida show an elongation of the fruiting stems to about three times the normal length, a change that may be ascribed to bud variation. Bud selection has been attempted over a long period of years by two experiment stations without any increase in yield.

FIRST STAGE IN GROWTH OF A STRAWBERRY

After the ovules have been fecundated, the petals drop from the flower, leaving it in the condition shown above. The seeds, one of which is located at the base of each pistil, begin to develop, soon afterward the pollen-bearing stamens wilt and fall off, and the pistils begin to shrivel up. Photograph by John Howard Paine. (Fig. 4.)

the South. Let us see just what net result the work of all these breeders has produced. If we turn to statistics we find that in 1914 the commercial shipments of fresh strawberries in the United States totaled 14,553 carloads. Of these 8,369 carloads came from southern States and largely from sections in those States to which the strawberry is not native. The greater part of the shipments consist of varieties originating in the South as the result of definite breeding work, and in the following table is shown the percentage of the total acreage represented by each variety together with the place of origin of most of the varieties.

THE BERRY BEGINS TO DEVELOP

Botanically speaking, the strawberry is not a berry at all. It is what is called an accessory fruit, consisting of a lot of seeds on the outside of a "receptacle." This receptacle is, in fact, merely an enlargement of the end of the stem. As the seeds develop, the end of the stem—the so-called receptacle—also develops, and soon does so very rapidly. At the stage shown above the seeds have developed until they quite dwarf the shriveled stamens; at the same time the receptacle has swelled up until the typical berry appearance is seen. The seeds will presently ripen and harden, and the receptacle will continue to swell until it forms the delicious mouthful which led the Bishop to exclaim, "Doubtless God could have made a better berry, but doubtless God never did." When mature, the seeds are so small that they are hardly felt in the mouth; yet it must not be forgotten that they alone are, in a botanical sense, the fruit of the plant, the enlarged stem-end, although much more important to man, being of little consequence to the plant, and merely an accessory to the seeds. Photograph by John Howard Paine. (Fig. 5.)

SEEDS OF THE STRAWBERRY

Part of the surface of a large, fully ripe strawberry is here shown, highly magnified. The shriveled pistils can still be seen projecting from under the seeds, except in a few cases where they have been rubbed off. As the edible "berry" is functionally merely a structure to carry the seeds, its size is roughly proportional to the number of seeds borne. It will therefore probably never be possible to breed a seedless strawberry, or even to reduce the number of seeds materially, for to do so would leave no reason for the existence of the "berry" and it would therefore not be formed. Photograph by John Howard Paine. (Fig. 6.)

This table shows that practically all varieties grown in the South originated there. The Aroma and Gandy are the chief exceptions and they are grown

ORIGIN OF VARIETIES OF STRAWBERRIES GROWN IN THE SOUTH, EXCLUSIVE OF THE STATES OF KENTUCKY, WEST VIRGINIA, MARYLAND AND DELAWARE.

	Extent grown in the South.		
Variety	*% of total acreage*	*Where originated*	*By whom*
Klondike	79	Hammond, La.	R. L. Cloud.
Aroma	8	Kans.	F. W. Cruse.
Missionary	7	Norfolk, Va.	Volunteer.
Gandy	2	Newport, N. J.	Volunteer.
Excelsior	2	Judsonia, Ark.	Louis Hubach.
Thompson	1	Mt. Olive, N. Car.	Volunteer.
Hathaway	slightly	Judsonia, Ark.	Louis Hubach.
St. Louis	slightly	Judsonia, Ark.	Louis Hubach.
Mitchel	slightly	Judsonia, Ark.	Volunteer.
Jamestown	slightly	Norfolk, Va.	Volunteer.
Dixie	slightly	Mt. Olive, N. Car.	Volunteer.
Ozark	slightly	Sarcoxie, Mo.	Chas. Shull.
Neuman	slightly	No. or So. Carolina	
Nick Ohmer	slightly	Dayron, Ohio.	J. F. Beaver.
Market	slightly	Judsonia, Ark.	Louis Hubach.
Eureka	slightly	Judsonia, Ark.	Louis Hubach.
Mellie	slightly	Judsonia, Ark.	Louis Hubach.
Champ Clark	slightly	Nashville, Tenn.	Volunteer.
Bubach	slightly	Princeton, Ill.	J. E. Bubach.
Hefflin	slightly	N. Car.	
Three W	slightly	Harriman, Tenn.	Volunteer.
Corneille	slightly	Pouchatoula, La.	

only in the northern part. Of the leading varieties originating in the South, the Missionary and the Thompson were found as seedlings and brought into cultivation. They form 8% of the total, while the Klondike and Excelsior which are the result of definite breedingwork constitute 81% of the total. Further, certain of these varieties are grown extensively elsewhere. Thus the Klondike is a leading variety in California, Illinois, Maryland, and Delaware.

The strawberry stands forth as one of the conspicuous examples of successful breeding and it is doubtful if any other fruit in the United States can show as remarkable a record.[3] The modern industry is, in fact, almost wholly the creation of modern scientific breeding. But the work is not finished. There is still room for improvement and opportunity for the production of better varieties. The breeders of the South say, as the result of their experience, that the ideal strawberry of the future should possess the following qualities:

1. The plant should be as disease-resistant as the Aroma.
2. It should make runners as freely as the Klondike or Aroma.
3. It should be at least as productive as the most productive variety in each section.
4. It should have a perfect flower.
5. The blossoms should be as well protected from frost as the Missionary.
6. The berries should be as uniform in size throughout the season as are the Aroma and Chesapeake in sections to which they are adapted.
7. The berry should be as uniform in shape as the Chesapeake in sections to which it is best adapted.
8. The berry should be as firm as the Klondike is in the South.
9. The berry should be as solid as the Klondike.
10. The berry should be at least as large as the Klondike.
11. The berry should have as red a flesh as the Klondike.
12. The fruit should be as easy to pick as the Klondike.

There are other characteristics that are desirable in varieties adapted to special purposes. Growers in central Florida must have a variety that ripens very early and continues to ripen through a long season as does the Missionary. Canners do not like a berry having a cap as hard to remove as that of the Klondike. They do, however, desire varieties with its deep red color, and strong acid flavor. They also like a berry that retains its shape after cooking. Growers in some sections wish an early variety, the crop of which will ripen quickly, and be out of the way in order that they may turn to other farm work needing attention. Others wish two quick-ripening varieties, one following the other in season.

Studies of Inheritance in Guinea-Pigs and Rats

STUDIES OF INHERITANCE IN GUINEA-PIGS AND RATS, by W. E. Castle and Sewall Wright. Pp. 192, 7 plates, price $2.50. Washington, D. C., Carnegie Institution, 1916.

Part I of this highly technical volume is an account by Dr. Castle of a trip to the home of the guinea-pig in Peru. He concludes that probably all of the differences in coat-color which fanciers now recognize appeared in South America, where guinea-pigs have been bred for centuries as a source of meat, and observes that "the guinea-pig has undergone in domestication more extensive variation in color and coat characters than has any other mammal." He brought back three new races, and describes hybridization experiments with them. In Part III, Dr. Castle continues his studies on selection in piebald rats, adding to the evidence for a modification of the unit hooded character,and describes a case of gametic coupling in yellow rats. In Part II, Dr. Wright makes "an intensive study of the inheritance of color and of other coat characters in guinea-pigs with especial reference to graded variations," in the course of which he develops a suggestive hypothesis to explain the physiological basis of the inheritance of coat color.

[3] Compare "The Strawberry, a Triumph of Plant Breeding," in the JOURNAL OF HEREDITY VII, p. 191, April, 1916.

THE TIDE OF IMMIGRATION

Indirect Results on Eugenics are Quite as Important as Direct Results—Admission of Too Much Unskilled Labor Said to be Partly Responsible for Fall of Birth Rate in Old American Population

A Review

THERE are now in the United States some 14,000,000 foreign-born persons, together with other millions of the sons and daughters of foreigners, who although born on American soil have as yet been little assimilated to Americanism. This great body of *Uitlanders*, representing perhaps a fifth of our population, is not a pool to be absorbed, but the emptying in of a continuous stream, which, until the war, was steadily increasing in volume, and of which the fountain-head is so inexhaustible as to appal the imagination.

The character of this stream will inevitably determine to a large extent the future of the American nation. The direct biological results, in race mixture, are important enough, although not easy to define; the indirect results, which are probably of no less importance to eugenics, are so hard to follow that some students of the problem do not even realize their existence.

A few thinkers have indeed been pointing out for many years that the consequences of this immigration are much more far-reaching than we suppose. The American Genetic Association's committee on immigration has been persistently urging[1] that the problem of regulating immigration should be lifted above the plane of party politics and placed in the field of statesmanship. The present war, which has temporarily almost stopped immigration, gives the nation an excellent opportunity to take stock of its affairs and adopt a rational policy for future guidance.

For this purpose we need all the facts available, and Frank Julian Warne, special expert on foreign-born population of the thirteenth United States census, has done a service in publishing an account of "The Tide of Immigration."

Dr. Warne's book[2] is not a masterpiece—it shows much use of the scissors and paste-pot, and an atmosphere of special pleading. It has neither the brilliancy nor the biological viewpoint of such a work as Prof. E. A. Ross's "The Old World in the New." But it will be very serviceable because it is timely, because it brings together a great amount of information, and because it is rich in the little details of politics which will be uninteresting five years hence, but which just now one wants very much to know.

OLDER AND NEWER IMMIGRATION

Dr. Warne follows the usual course by describing the immigration of the first three-quarters of the nineteenth century, most of which was from races closely allied to the Anglo-Saxon, and which strengthened the United States immensely. Then he tells how this stream dried up and was succeeded by a flood of Southern Italians, Slavs, Greeks and Russian Jews, and last of all by an overflow from the Eastern Mediterranean. A large part of the later immigration is "promoted;" agents of

[1] See "First Report of the Committee on Immigration," *American Breeders' Magazine*, Vol. iii, pp. 249–255, 1912; "Second Report of the Committee on Immigration," JOURNAL OF HEREDITY, Vol. v, pp. 297–300, 1914; "War, Immigration, Eugenics," Third Report of the Committee on Immigration, JOURNAL OF HEREDITY, Vol. vii, pp. 243–248, 1916.

[2] "The Tide of Immigration," by Frank Julian Warne. Pp. 388, price $2.50 net. New York, D. Appleton & Co., 1916.

transportation companies and others who stand to gain stir up the population of a country village in Russia or Hungary, excite the illiterate peasants by stories of great wealth to be found in the New World, take a mortgage on the farm, provide the immigrant with a ticket and start him for Ellis Island. Or else the immigration represents a floating supply of casual laborers, who drift in during a period of prosperity in America, and drift out when business depression curtails the demand for their muscle. "The fact is, and a startling fact it is, too, immigration today and in the large has become a colossal business enterprise—a huge commercial undertaking—the wholesaling of human labor for gain." "The religious and political motives have almost wholly disappeared in favor of the economic in modern immigration." Naturally, such immigration is predominantly male. On the whole, females make up one-third of the inflow, but among some races—Greeks, Italians and Roumanians, for example—only one in five is a woman.

Most of the immigrants are merely ignorant, vigorous peasants, imbued with a natural desire to make money. There is, however, a considerable element of undesirables—it is on this element that eugenicists have fixed their attention, perhaps too exclusively, in the past. Dr. Warne charges that many of these undesirables are informed that the immigrant rush is greatest in March and April, and that they therefore make it a point to arrive at that time, knowing the medical inspection will be so overtaxed that they will have a better chance to get by. When three or four thousand immigrants arrive in a single day, the examiners must pass them almost as rapidly as the conductor on the street car punches transfers; and it is naturally difficult to arrive at any sound judgment, as to the alien's physical, mental, moral, and economic status and the possibility of his becoming a public charge.

The American Genetic Association has long demanded an increase of the facilities for inspection. But no increase would shut out all undesirables. Insanity, for example, appears among the aliens to such an extent that a large part of the inmates of State hospitals in States on the Atlantic seaboard are foreign-born.[3] Probably few of them were actually insane when they passed through the port of entry. Insanity, it must be remembered, is predominantly a disease of old age, whereas the average alien on arrival is not old. The mental weakness appears only after he has been here some years, perhaps inevitably or perhaps because he finds his environment in, say, lower Manhattan Island much more taxing to the brain than the simple surroundings of his farm overlooking the bay of Naples.

The difficulty or impossibility of shutting out individually all the undesirable immigrants is so marked that many students, including Dr. Warne, have decided that the easiest and most effective solution is to put a wholesale restriction on immigration, such as is contemplated by the literacy test, which is designed not so much as a sieve, but as a measure to cut down the volume of arrivals. Such a restriction would likewise, it is claimed, diminish the social problems which the huge volume of immigration creates.

With the general character of these social problems we are all familiar. Though it is true that much of America's social progress is due to the immigrants of the past century, it is not less true that the immigrants of the last generation have created some very difficult problems with their low standards of living and their inability to understand American ideals and institutions.

These social difficulties, important enough, are more obvious and less insidious, probably less serious, than the economic difficulties which are laid to immigration. The immigrant arrives

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[3]Of the total number of inmates of insane asylums of the entire U. S. of January 1, 1910, 28.8% were whites of foreign birth, and of the persons admitted to such institutions during the year 1910, 25.5% were of this class. Of the total population of the United States in 1910 the foreign-born whites constituted 14.5%.—Special report on the insane, Census of 1910 (published in 1914).

with a low standard of living. With prosperity and the example of Americans, he gradually adopts a higher standard of living; and just at that time his industry is swamped with a new flood of immigrants with lower standards, which drags down those who would otherwise rise. Such is one view of the case; others reply that, on the contrary, the influx of unskilled labor creates industries which mean more wealth and better jobs for the earlier arrivals, and for the old American stock.

ECONOMIC CONSEQUENCES

Obviously, the ultimate effects of immigration depend largely on the question which of these views is more nearly correct. It is a question of whether the Americans and older immigrants must directly compete for jobs with the new arrivals, or whether the new arrivals, although competing with each other, really furnish jobs for the longer-established and more skilled residents of the country. Truth is doubtless to be found on both sides, but Dr. Warne leans to the first view, and cites the Immigration Commission, among other authorities, in his support. Prof. H. P. Fairchild of Yale is quoted as follows:

"It is claimed that the natives are not displaced, but are simply forced into higher occupations. Those who were formerly common laborers are now in positions of authority. While this argument holds true of individuals, its fallacy when applied to groups is obvious. There are not nearly enough places of authority to receive those who are forced out from below. The introduction of 500 Slav laborers into a community may make a demand for a dozen or a score of Americans in higher positions, but hardly for 500. Furthermore, in so far as this process does actually take place, it must result in a lowering of the native birth rate, for it is a well-known fact that in all modern societies, the higher the social class, the smaller is the average family."

Prof. Jeremiah W. Jenks, formerly a member of the Immigration Commission, wrote to President Taft that "The number of unskilled workers coming in at the present time is sufficient to check decidedly the normal tendency toward an improved standard of living in many lines of industry. . . . Figures collected by the Immigration Commission, from a sufficient number of industries in different sections of the country to give general conclusions, prove beyond doubt that in a good many cases these incoming immigrants actually drive out into other localities and into other unskilled trades large numbers of American workingmen and workingmen of the earlier immigration who do not get better positions but rather, worse ones."

With this standpoint, Dr. Warne concludes, "We must consciously realize that it is not conducive to the success of American democracy that the native worker should be content with a standard of living as low as that of the [present] immigrant. This American is more than an industrial toiler; he is a citizen; also, he is a husband and a father. His wants are naturally greater in number and these he can satisfy only through wages. He is subject to inescapable pressure from all those social, religious, political, educational, and economic forces which are back of that constant tendency so noticeable in the United States for the standard of living of the people to increase. The wages of the native worker should be released sufficiently from the competition of the immigrant to permit that elasticity which keeps wages within promising distance of the standard of living. This can be influenced in part through better governmental regulation of the volume of immigration."

INCREASING THE BIRTH RATE

The conclusion is worth emphasizing because, if well founded, it has an important bearing on eugenics. It is pretty well recognized now that the low birth rate among the most useful and enlightened classes is principally economic in origin, and that it is useless to try to get people to have children if they cannot afford it. Any successful

eugenic propaganda must, therefore, be preceded by such economic and social changes as will make it economically and socially possible for young married people to have children; and it seems probable that a restriction of the volume of unskilled labor arriving in this country would be one of those changes.

Dr. Warne devotes two chapters to the argument that better distribution of immigrants, which is sometimes proposed as a panacea, would in reality produce little result. Apparently he would hardly go even as far as President Roosevelt who said that "distribution is a palliative, not a cure." Then, feeling sure that a considerable restriction of the inflow is desirable, he takes up the discussion of how this is to be secured.

The Immigration Commission appointed by President Roosevelt in 1907 made a report to Congress on December 5, 1910, in which it declared in favor of restriction and suggested the following possible methods:

1. The exclusion of those unable to read or write in some language.

2. The reduction of the number of each race arriving each year to a certain percentage of the average of that race arriving during a given period of years.

3. The exclusion of unskilled laborers unaccompanied by wives or families.

3. The limitation of the number of immigrants arriving annually at any port.

5. Material increase in the amount of money required to be in the possession of the immigrant at the port of arrival.

6. Material increase of the head tax.

7. The levying of the head tax so as to make a marked discrimination in favor of men with families.

Eugenically, it is doubtful whether (3) and (7), which would tend to admit only families, would be a gain or a detriment to the welfare of the race. (1) and (2) have been the suggestions which have aroused the most controversy. All but one member of the commission favored (1), the literacy test, as the most feasible single method of restricting undesirable immigration and, as readers know, three attempts to enact it into a law have been made, but have been defeated by the vetoes of President Cleveland, Taft and Wilson. The measure is now pending before Congress again. Dr. Warne's enumeration of the influences for it and against it is enlightening and interesting.

PREVALENCE OF ILLITERACY

Records for 1914 show that "illiteracy among the total number of arrivals of each race ranged all the way from 64% for the Turkish to less than 1% for the English, the Scotch, the Welsh, the Scandinavian and the Finnish. The Bohemian and Moravian, the German, and the Irish each had less than 5% illiterate. Races other than the Turkish, whose immigration in 1914 was more than one-third illiterate, include the Dalmatians, Bosnians, and Herzegovinians; Russian Ruthenians, Italians, Lithuanians, and Roumanians."

To bar these illiterates, Elihu Root said, would be an advantage because "the coming of great numbers of people who are wholly illiterate and who have to take, of course, the lowest rate of wages, whose minds are not open to the ordinary opportunities for bettering their condition, does tend to break down the American standard of wages, and to compel American workmen, whether they be born here or be a part of the 9,000,000 who have come in since the war with Spain, to compete with a standard of wages and a standard of living that they ought not to be required to compete with."

It will, Dr. Warne admits, keep out some who ought to come in, and let in some who ought to be kept out. It is, he grants, a test of opportunity rather than of character. It is not claimed to be perfect, or to be a test of the real character of the immigrant.

"The literacy test is simply and solely a restrictive test and is proposed as such. In the belief of its advocates, it will meet the situation as disclosed by the investigation of the Immigration Commission better than any other means that human ingenuity can devise. It is believed that it would exclude more of the undesirable and a less

number of the desirable immigrants than any other method of restriction. It goes to the root of the evils, which are largely economic."

TEST A MERE RESTRICTION

"The literacy test is not aimed primarily at illiteracy. It is not aimed at the immigrant as such. Under favorable conditions the illiteracy of the immigrant is sooner or later remedied. It is not directed against any particular race or against aliens from any particular country. It is directed primarily against the volume of immigration, and is justified in the fact that the conspicuous character of large numbers of immigrants is their inability to read and write. And the literacy test is aimed at the quantity of immigration primarily, and solely for the purpose of bringing it within a reasonable degree of our ability to absorb and assimilate its elements."

In spite of its three defeats, it seems likely that the literacy test as a restriction of immigration will again be passed by Congress this winter, that it will again be vetoed by President Wilson, and that another attempt will be made to pass it over the President's veto. This reopening of the question offers an opportunity of which eugenicists should take advantage. Whatever their views as to the best method of restriction may be, they should attempt to get more widespread a realization of the eugenic implications of excessive immigration, not only in the bad breeding which results from the admission of a certain number of physical and mental undesirables; but indirectly from the economic results. If they believe that excessive immigration of unskilled labor is partly responsible for the conditions which make it hard for a larger part of the population to have any, or enough, children, they should keep this fact to the front. Every such effort will aid to bring nearer the social and economic readjustments which a policy of national eugenics requires.

Pollination Studies on California Fruits

Plum and prune pollination investigations have been carried on during the past three years by Hendrickson at the California State Agricultural Experiment Station. Observations in 1915 on 50,000 plum and prune blossoms and on 87,000 during 1916 show definitely that all varieties of the Japanese group of plums (*P. triflora*) are self-sterile with the possible exception of Climax. The varieties of this group seem to cross-pollinate readily. Of the European varieties of plums (*P. domestica*), Tragedy and Clyman show distinct evidences of self-sterility. French and Sugar prunes seem to be self-sterile to some extent. Robe de Sergeant and Imperial prunes are distinctly self-sterile. Imperial, French, and Sugar prunes seem to cross-pollinate satisfactorily.

An important observation during the season of 1916 has been the noticeable lack of pollinating agencies in some prune orchards. The normal set of French prunes was about 4% as compared with 19% on a tree which was covered with a mosquito net tent under which the bees were confined.

During 1916 observations on almonds by Tufts show that there is a distinct pollination problem with this fruit. Thirteen varieties, including practically all grown on a commercial scale in California, proved to be wholly self-sterile under conditions existing at the university farm. Of still greater importance is the fact that the Nonpareil and I. X. L., two of the leading varieties, were found to be intersterile as well as self-sterile. Ne Plus Ultra was found to be very satisfactory as an interpollinizer with both I. X. L. and Nonpareil.

Observations during 1916 by Tufts on cherries show that the leading commercial varieties grown in the State, including Napoleon (Royal Ann), Lambert, Bing, Black Tartarian and Black Republican, are self-sterile. There is also distinct evidence of intersterility between several varieties, for example, Bing and Napoleon. The work has not yet gone far enough to determine the best pollinizers for cherries in this State.—*Annual Report of Director.*

AN IMMIGRATION POLICY

Any Plan for Restriction Must Take Account of Asia as Well as Europe—Percentage Basis the Best One for Limitation—Arrangements Must be Made to Americanize Those Who Come

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THE need of adequate and wise immigration and Americanization legislation is imperative. Now, while war suspends the tide of new-comers to our shores, is the time for enacting the new laws to regulate the coming of fresh aliens.

No one can foretell how large or small will be the immigration from the war-ravaged countries of Europe. One factor in the problem that is generally overlooked is this: Wages in America will be high after the war and demand for cheap labor will be urgent. Immigration companies and steamship lines will seek for fresh sources of cheap labor to bring to America. What is to prevent them from securing hundreds of thousands from West and North Africa, Egypt, Syria and Asia Minor?

Present laws afford no method of control either of the numbers or of the race types that may be admitted, if only they pass the physical tests now authorized. We have reason to expect a large immigration of peoples that will prove extremely difficult of Americanization.

We need, therefore, a comprehensive and constructive policy for the regulation of all immigration, a policy that is based on sound economic, eugenic, political and ethical principles, and a program worked out in detail for incorporating that policy into practice.

Such a policy, moreover, must take into consideration not merely the relations of America with Europe, Africa and West Asia, but also with China, Japan and India. The world has become so small and travel so easy that economic pressure and opportunity are now bringing all the races into inevitable contact and increasing intermixture. To avoid the disastrous consequences of such contacts and intermixtures, and to enable the United States not only to provide for her own prosperity, but also to make to the whole world her best contribution for human betterment, we need policies that are based upon justice and good will, no less than upon economic and eugenic considerations.

The following proposals are offered as a contribution to the discussion of these important matters.

The need of regulating immigration from Europe and West Asia is so well recognized that nothing further will be said upon it in this brief discussion. It is important, however, that Americans should realize that the present laws dealing with Japanese, Chinese and Hindoos are quite obsolete. They are not only obsolete; they are positively dangerous.

THE NEW ORIENT

New Japan has already acquired the mechanical instruments, the political, economic and industrial methods, and the science, education, ideas and ideals of occidental civilization. New China is rapidly following in the footsteps of Japan. Both are increasingly self-conscious and insistent on courteous treatment and observance of treaties. They are asking, with growing earnestness, for recognition on a basis of equality with nations of the West.

The great world-problem of the twentieth century is undoubtedly the problem of the contact of the East and the West. Whether it shall bring us weal or woe depends largely on the United States. Shall our oriental policy

be based on race pride, disdain and selfishness? Shall it be entirely devoid of sympathy? And shall we rely on brute force for carrying it through? Or shall we give justice, courtesy and a square deal, refusing to be stamped by ignorance, ill-founded suspicion and falsehood? Shall we "prepare" to maintain by our military might a policy of arrogant disregard of their needs and feelings, or shall we remove dangers of conflict by a policy of friendly consideration and genuine helpfulness?

The new Orient renders obsolete and dangerous our nineteenth century Asiatic policy. Let us now promptly adopt a new policy—one that will provide, on the one hand, for the just demands of the Pacific Coast States to be protected from a swamping Asiatic immigration; and yet that also provides on the other hand for full courtesy of treatment and for complete freedom from race discrimination which is inevitably regarded as humiliating. The new policy should provide for observance of the spirit no less than of the wording of our treaties, and be thus in harmony with the principles of good neighborliness.

THE NEW IMMIGRATION POLICY

All this means that we need comprehensive immigration legislation dealing with the entire question in such a way as to conserve American institutions, protect American labor from dangerous economic competition, and promote intelligent and enduring friendliness between America and all the nations, east and west, because free from differential race treatment.

Restriction of immigration has been widely demanded in recent years. Three times Congress has passed a literacy test immigration bill. Three times has it been vetoed. But even if it became law, would it suitably and adequately regulate immigration? Would it avail in maintaining a wholesome proportion between the aliens and the naturalized? Moreover, a literacy test law could not wisely be applied to Asiatics, for it would admit millions.

Do we not now need legislation, limiting immigration on a numerical basis? Should not the annual immigration be adapted to our economic conditions? And should not that limitation deal equally with all races? Should not our immigration legislation, moreover, also provide for the rapid education and Americanization of those who are admitted?

Such a policy and program constitutes one of the pressing needs of the times. Quite as important as military "preparedness" to resist attack is diplomatic and legislative "preparedness" to reduce tension and promote international friendship.

The following paragraphs present in barest outlines a constructive program for comprehensive immigration legislation:

1. The Control of Immigration.

Immigration from every land should be controlled, and, if excessive, it should be restricted. The principle of restriction should be applied equally to every land, and thus avoid differential race treatment.

2. Americanization the Principle of Control.

The proved capacity for genuine Americanization on the part of those already here from any land should be the measure for the further immigration of that people. Newcomers make their first contact with America through those who speak their own language. The Americanization, therefore, of newcomers from any land depends largely on the influence of those already here from that land. The number of newcomers annually admissible from any land, therefore, should be closely dependent on the number of those from that land who, having been here five years or more, have actually become American citizens. These know the language, customs and ideals of both peoples, ours and theirs.

America should admit as immigrants only so many aliens from any land as she can Americanize.

3. The Proposed Restriction Law.

Let, therefore, an immigration law be passed which provides that the maxi-

mum permissible annual immigration from any people shall be a definite per cent (say five) of the American-born children of foreign parents of that people plus the number of those from that same people who have already become naturalized citizens.

The grandchildren as a rule do not know their ancestral language, and therefore do not aid particularly in the Americanization of newcomers.

The permissible annual immigration from the respective peoples, as calculated from the census of 1910, is given in the tables of the Appendix. They show that in general there would be no restriction on immigration from North Europe. The reverse, however, would be the case for the countries of South Europe. The permissible immigration from China and Japan would be less than that which has been coming in recent years. (See Appendix.)

Provision should be also made for the protection of all newcomers from ruthless exploitation and for their distribution, employment and rapid Americanization. To aid in the accomplishment of these ends, the Federal Government should establish—

4. Bureau of Registration, Employment and Distribution

All aliens should register annually until they become American citizens, and should pay an annual registration fee, of say $10. We need to know who the aliens are and where they live, and they need to know that we know these facts about them. A system of registration could be worked out in connection with a National Employment Bureau as suggested by the late Prof. Henderson that would not involve police surveillance. This Bureau should be regarded as a method for friendly aid, not of hostile and suspicious control.

Plans, moreover, should also be developed for a system of distribution. This would not be difficult if a Federal Bureau of Distribution were established with an adequate capital fund and enabled by proper legislation to purchase by condemnation at fair prices agricultural lands fitted for settlement, now held by speculators. These should be sold to immigrant settlers on long mortgages and easy terms, and providing capital for initial outfit. Privileges of establishing homes upon relatively easy terms should be extended not only to immigrant aliens but to any applicants whether alien or American citizens.

5. A Bureau for the Education of Aliens

This Bureau should set standards, prepare text-books, promote the establishment of night schools by States, cities and towns—which might receive Federal subsidies—and hold examinations. The education and the examinations should be free. Provision should be made for the reduction of the registration fee by, say $1, for every examination passed. The education should be simple and practical, avoiding merely academic proficiency. Let there be six examinations, three in English and one each in the History of the American People, in the Methods of our Government, Local, State and Federal, and in the Ideals of Democracy. When all the examinations have been passed, there would still remain the annual registration fee of $4, so long as the individual chooses to remain an alien. There should also be—

6. New Regulations for the Bureau of Naturalization

Citizenship should be granted only to those who have passed the required examinations provided by the Bureau of Alien Education and have maintained good behavior during the five years of probationary residence. The naturalization ceremony might well take the form of a dignified welcome service—say on a single day in the year—the Fourth of July, with appropriate welcome orations, banners, badges and banquets.

7. Citizenship for All Who Qualify, Regardless of Race

Eligibility to naturalization should be based upon personal qualifications of intelligence, knowledge and character.

The mere fact of race should be neither a qualification nor a disqualification.

Such are the main outlines of the proposed Comprehensive and Constructive Program here offered for the solution of the entire immigration problem, Asiatic as well as European. For a more adequate understanding, however, of this general proposal we should consider—

8. A Few Additional Details

(*a*) No change should be made in the schedule for maximum immigration between the census periods. With each new census a new schedule should be prepared, but it should not go into operation automatically. Congress should reconsider the whole matter once in ten years upon receiving the figures based upon the new census, and decide either to adopt the new schedule or some new percentage rate, or possibly to continue the same schedule for another decade.

(*b*) Provision should be made for certain excepted classes. Government officials, travelers and students would, of course, be admitted outside of the fixed schedule figures. Aliens who have already resided in America and taken out their first papers, or who have passed all the required examinations, should, also, doubtless be admitted freely regardless of the schedule. Women and children under 14 years of age should also be included among the excepted classes. If thought important, unmarried women 25 years of age and over might be subject to the percentage rate. By providing for such exceptions the drastic features of the proposed plan would be largely, perhaps, wholly relieved.

(*c*) Should the restriction required by the 5 per cent plan be regarded as excessively severe, the per cent rate could be advanced. In any case it seems desirable that the 5 per cent restriction should be applied only to males 14 years of age and over, and to unmarried women 25 years of age and over.

(*d*) In order to provide for countries from which few have become American citizens, a minimum permissible annual immigration of, say 1,000, might be allowed, regardless of the percentage rate.

(*e*) Registration, with payment of the fee, might well be required only of male aliens 21 years of age and over. Since, however, it is highly desirable that immigrant women also should learn the English language, provision might be made that all alien women should register without payment of the fee and be given the privileges of education and of taking the examinations free of cost. This privilege might extend over a period of five years. After passing the examinations there should be no further requirement for registration. If, however, after five years the examinations have not been passed, then they should be required to pay a registration tax of six dollars annually, a reduction of one dollar being allowed for every examination passed.

(*f*) In order to meet special cases and exigencies, such as religious or political persecutions, war, famine or flood, provision might well be made to give special power to the Commissioner of Immigration in consultation with the Commissioner of Labor and one or two other specified high officials to order exceptional treatment.

(*g*) The proposed policy, if enacted into law, would put into the hands of Congress a flexible instrument for the continuous and exact regulation of immigration, adapting it from time to time to the economic conditions of the country.

(*h*) How the war is to influence future immigration is uncertain. Some anticipate an enormous increase, while others expect a decrease. Is it not important for Congress to take complete and exact control of the situation while the present lull is on and be able to determine what the maximum immigration shall be before we find ourselves overwhelmed with its magnitude? If the post bellum immigration should prove to be small, a law limiting it to figures proposed by this plan would not restrict it. If it should prove to be enormous we would be prepared to deal with it.

(*i*) An objection to the proposed plan is raised by some. It is urged that tens of thousands would suffer the hardship of deportation because of arrival after the maximum limit has been reached. Such a situation, however, could easily be avoided by a little care in the matter of administration. Provision could be made, for instance, that each of the transportation lines bringing immigrants from any particular land should agree with the immigration office upon the maximum number of immigrants that it may bring to America during the year, the sum total of these agreements being equal to the maximum permissible immigration from that particular land. There would then be no danger of deportation because of excessive immigration. The steamship lines, moreover, would see to it that their immigration accommodation would be continuously occupied throughout the year, avoiding thus a rush during the first two or three months of the year.

(*j*) A second objection is raised by some, namely, the difficulty of selecting the favored few in those countries where the restriction would be severe. This difficulty, however, would be completely obviated by the steamship companies themselves. Immigrants would secure passage in the order of their purchase of tickets; first come, first served.

(*k*) In order to alleviate hardship as far as possible, might not immigration inspection offices be established in the principal ports of departure, and provision be made that all immigration from specified regions should receive inspection at those offices alone, such inspection to be final?

Would not the above proposals for a comprehensive and constructive immigration policy coördinate, systematize and rationalize our entire procedure in dealing with immigration, and solve in a fundamental way its most perplexing difficulties? Such a policy would protect American labor from danger of sudden and excessive immigration from any land. It would promote the wholesome and rapid assimilation of all newcomers. It would regulate the rate of the coming of immigrants from any land by the proved capacity for Americanization of those from that land already here. It would keep the newcomers of each people always a minority of its Americanized citizens. It would be free from every trace of differential race treatment. Our relations with Japan and China would thus be right.

Such a policy, therefore, giving to every people the "most favored nation treatment," would maintain and deepen our international friendship on every side.

Criticism of this plan is invited. If the reader finds himself in harmony with this proposal a letter of endorsement would be appreciated.

APPENDIX

The statistical tables of this appendix give the actual immigration of the five years ending June 30, 1915, so classified as to show what the effect upon that immigration would have been if the proposed 5 per cent standard for its limitation had been in force. The basal figures here given have been especially prepared for the writer by the statistician of the United States Bureau of Immigration.

In classifying aliens the Immigration Bureau distinguishes between immigrants (who come for permanent residence here) and non-immigrants (who come for a transient stay). The 5 per cent restriction proposal as worked out in these statistics does not limit the entering of non-immigrants, of children or of women. It affects only males 14 years of age and over.

Column 6 gives the standards for the maximum permissible annual immigration of males from the various races and peoples according to the 5 per cent restriction policy advocated in this article. This column is derived from the census of 1910; the figure for each people is 5 per cent of the American born children of foreign parents of that people plus the number of those from that same people who have become naturalized citizens. This last item (the nat-

TABLES SHOWING HOW THE FIVE PER CENT RESTRICTION PROPOSAL WOULD HAVE AFFECTED IMMIGRATION FOR THE PERIOD 1911–1915

	Table I: Aliens actually admitted during the five years ending June 30, 1915; cf. Annual Reports of Immigration Bureau, Tables IV and VII B					Table II: The proposed 5 per cent standard	
	1	2	3	4	5	6	7
Race or people	Non-immigrants	Immigrants	Female immigrants 14 years and over	Male immigrants 14 years and over	Annual average of column 4	Maximum permissible annual immigration of males (1)	Annual average of males who would have been excluded (2)
1. African (black)	16,173	34,221	13,042	18,114	3,622	209	3,413
2. Armenian	786	26,384	3,346	21,180	4,236	444	3,792
3. Bohemian and Moravian	2,689	40,332	14,199	18,388	3,677	16,994	.....
4. Bulgarian, Serbian and Montenegrin	6,301	48,556	3,873	42,506	8,501	5,601[4]	19,916[4]
5. Croatian and Slovenian	7,938	125,073	29,088	85,083	17,016	.....	.....
6. Chinese	12,090	9,760	1,212	7,778	1,555	1,106	449
7. Cuban	15,565	17,109	4,297	10,326	2,065	590	1,475
8. Dalmatian, Bosnian and Herzegovinian	920	18,046	2,169	15,185	3,037	[3]	.....
9. Dutch and Flemish	16,426	58,545	15,893	30,816	6,163	12,956	.....
10. East Indian	263	1,124	37	1,070	214	[3]	.....
11. English	166,990	252,877	91,865	119,730	23,946	127,745	.....
12. Finnish	6,387	45,453	16,423	24,956	4,991	5,038	.....
13. French	27,595	87,968	30,525	41,636	8,327	47,735	.....
14. German	79,920	313,279	109,081	148,634	29,726	333,581	.....
15. Greek	10,690	168,299	15,833	145,859	29,171	886	28,285
16. Hebrew	17,719	437,696	150,083	186,402	37,280	37,342	.....
17. Irish	49,317	168,592	75,491	81,220	16,244	201,491	.....
18. Italian (North)	36,282	154,751	33,319	104,502	20,900	45,768[5]	72,568[5]
19. Italian (South)	96,051	825,250	175,281	537,181	107,436	.....	.....
20. Japanese	15,562	36,599	22,317	12,292	2,458	1,220	1,238
21. Korean	58	403	205	159	32	[3]	.....
22. Lithuanian	2,697	79,974	28,442	44,766	8,953	4,360	3,593
23. Magyar	11,845	122,347	40,975	61,616	12,323	5,436	6,887
24. Mexican	23,462	75,821	20,179	36,752	7,350	8,648	.....
25. Pacific Islander	76	33	11	20	4	[3]	.....
26. Polish	26,631	462,696	151,604	260,008	52,001	49,212	2,789
27. Portuguese	4,702	44,461	12,274	24,809	4,961	3,788	1,173
28. Roumanian	4,038	52,361	8,836	40,320	8,064	676	7,388
29. Russian	15,789	142,167	16,255	119,513	23,902	2,203	21,699
30. Ruthenian (Russniak)	21,104	109,937	37,186	65,262	13,052	663	12,389
31. Scandinavian	56,621	176,513	58,573	102,701	20,520	102,095	.....
32. Scotch	41,193	100,518	37,603	46,275	9,235	38,776	.....
33. Slovak	7,153	101,815	33,385	53,849	10,769	6,831	3,938
34. Spanish	25,870	42,949	6,981	31,254	6,250	906	5,344
35. Spanish-American	9,268	7,069	1,764	4,237	847	128	719
36. Syrian	2,953	30,969	8,114	18,691	3,738	844	2,894
37. Turkish	436	7,235	370	6,672	1,334	58	1,276
38. Welsh	4,278	11,255	3,245	6,230	1,246	12,188	.....
39. West Indian (except Cuba)	6,329	5,663	2,213	2,814	562	17	445
40. Others	2,009	15,728	1,174	13,954	2,790		
Totals	852,176	4,459,831	1,276,763	2,592,770	518,554		

[1] For the derivation of the figures given in this column see explanatory paragraph of Appendix.

[2] The figures of this column are secured by subtracting the figures of column 6 from those of column 5.

[3] No census data.

[4] Bulgarians, Croatians, etc., are combined in this column.

[5] North and South Italians are combined in this column.

uralized citizens) was secured "by mathematical calculations based upon Tables XIII and XXXIII, pp. 975 and 1082, Vol. I of the Census Population Report for 1910." Subtracting the figures of column 6 from those of column 5 (the average annual number of males actually admitted) we secure column 7, showing the annual average number of males who would have been excluded had the 5 per cent limitation principle been in force.

The number of immigrant children admitted during the five years ending June 30, 1915, may be secured by subtracting the sum of the figures given in Table I, columns 3 and 4, from the corresponding figures given in column 2.

POINTS TO NOTICE

1. The proposals here advanced would have imposed more rigid restriction not only upon Japanese but also upon Chinese than is imposed by the present laws and arrangements.

2. The restriction upon Italians is particularly striking. But note the large disparity between Italian male and female immigrants.

3. The plan here proposed if in force would have imposed no restriction upon Hebrew immigration.

4. The average immigration from Europe for the past five years was, of course, seriously disturbed by the striking decrease for 1915 because of the war. Allowance must be made for this factor.

5. The restriction of the immigration of men will, of course, sooner or later affect that of women and children.

6. In column 6, the figure 1,000 should be substituted in each place where the 5% rate would allow an immigration less than this amount, in harmony with the proposal of paragraph (*d*) above.

7. The total annual average immigration of males from those countries whose actual immigration was less than their permissible maximum amounted to about 170,000 while the total permissible annual immigration of males from those countries that exceeded their permissible maximum amounted to about 136,000. If the immigration, therefore, of the past five years had been regulated by the policy set forth in this pamphlet, the average immigration of males from all countries would have been about 306,000 annually, instead of the average of 518,000 that actually were admitted.

A Hypothesis of Semi-sterility Confirmed

In accounts of semi-sterility ([1], [2], [3]), I stated in effect that the fertile F_2 plants from semi-sterile F_1 hybrids probably consisted of two classes KK and LL, such that intercrossing within the classes or back-crossing with the proper grandparent should give fertile plants, while crossing between the classes or back-crossing with the other grandparent should give perfectly half-sterile plants. This hypothesis has now been confirmed as regards back-crossing. Two completely fertile lines, descended from semi-sterile F_2, and one completely fertile F_2 plant were in the ordinary course of breeding back-crossed with the Florida velvet bean (*Stizolobium deeringianum*), one of their ascendants. Two (KK) plants have perfectly fertile progeny and one (LL) gave perfectly semi-sterile progeny, thus confirming the hypothesis. The Florida velvet bean has now been crossed with the Lyon, the Yokohama, and the China, with the production in each case of a completely semi-sterile first generation. Last year the cross of the Florida velvet with the fleshy-pod bean (*S. pachylobium*) was carried out, and yielded also a perfectly semi-sterile first generation.

JOHN BELLING.

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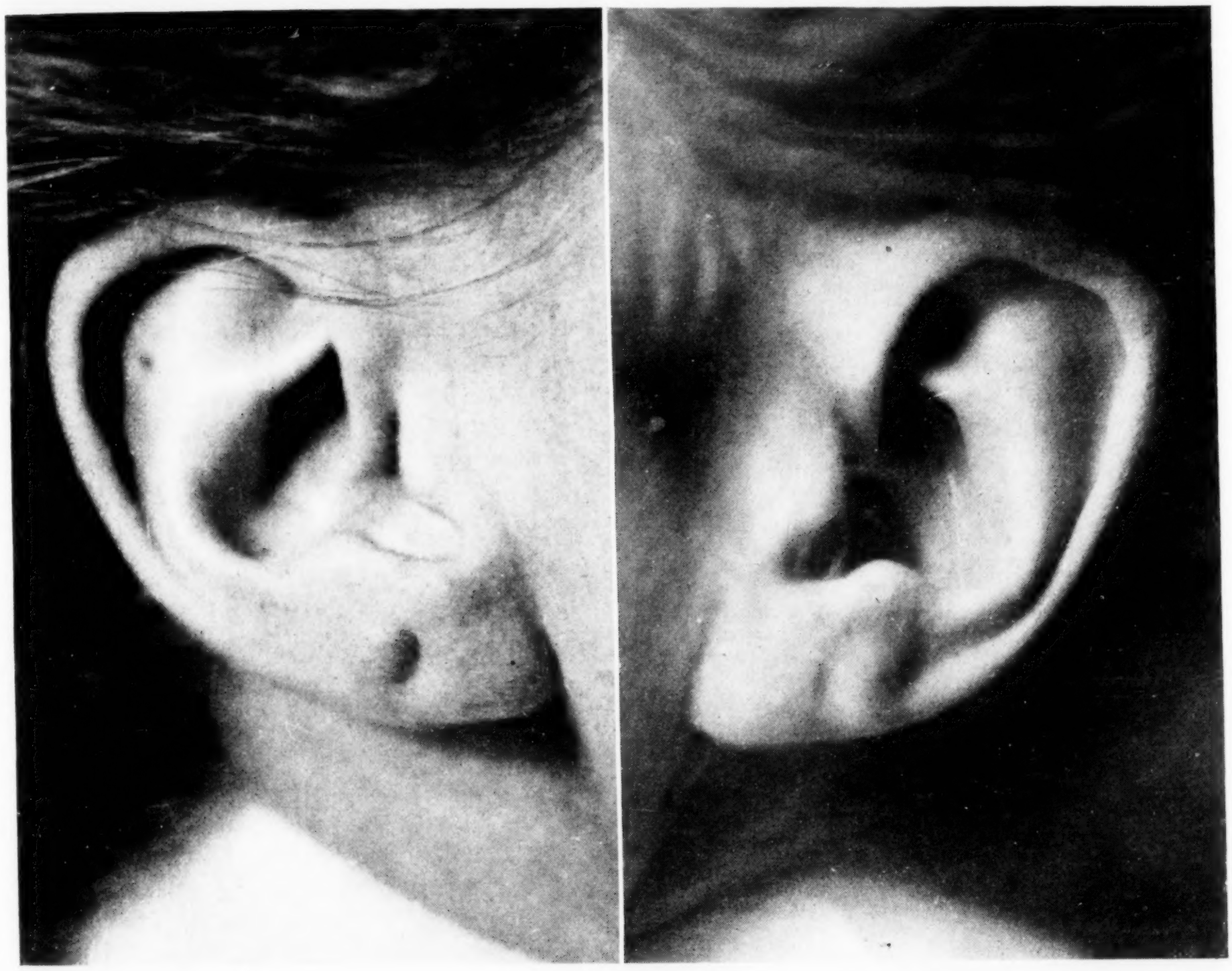
[1]Belling, J. A study of semi-sterility. JOURNAL OF HEREDITY, Vol. v (1914).
[2]Belling, J. The mode of inheritance of semi-sterility. Zt. f. Abst. und Vererbungslehre, 1914.
[3]Belling, J. Inheritance of semi-sterility. Fla. Exp. Sta. Report for 1914-5.

PITTED EAR LOBES OF CONGENITAL ORIGIN

ALBERT ERNEST JENKS
Professor of Anthropology, University of Minnesota



Pits found at birth in the lobes of the ears. (Fig. 7.)

A young woman in my class in Physical Anthropology recently reported an unusual mark on the lobes of both her ears which she and her family believe is inherited.

The accompanying pictures show a well-marked pit in the lobe of her right ear and a less distinct pit in the lobe of the left ear.[1] These photographs are reproduced without retouching. The pits are in substantially the same place they would have been, had the ears been pierced for rings.

The history of the case is as follows, as is believed and told by the young woman's mother:

The mother lives in Minneapolis. She was born in Karlstad, province of Varmland, Sweden. Her ears were pierced when she was about 2 years old, and she wears ear rings. It was the custom for men in Karlstad to wear ear rings at the time this mother's father was young. In consequence, the maternal grandfather of the young woman had had his ears pierced, and wore ear rings throughout his life. He died in Sweden. It is the belief of the young

[1] Photos are by Dr. E. K. Strachan of the School of Chemistry, University of Minnesota.

woman's mother that all her ancestors, both men and women, for many generations, wore ear rings.

The young woman's father was born in Trasmarken, province of Varmland, Sweden. It was not the custom for men in his neighborhood to wear ear rings, so his ears were not pierced. He died in Minnesota.

The young woman in question was born in Minneapolis in 1894. When she was two weeks old the family physician asked the mother why she had pierced the baby's ears so soon. An immediate investigation showed that the lobes of both ears had holes through them. This baby had been constantly in the immediate care of its mother and maternal grandmother, and the mother now says, "I know positively that no one did or could come in and pierce my baby's ears." Neither woman (according to the statement of the mother today) had noticed the holes in the ears until the physician called their attention to them. The physician, who was a European educated Swede, now dead, and the mother, and the grandmother, who is also dead, considered at the time that the holes in the lobes were "natural" to the babe. The family has always held that opinion. It was not until the young woman was studying the subject of the "inheritance of acquired characters" that she ever thought of her ears as being of interest.

Today there is a pit on both sides of each ear lobe, although there is no hole through either lobe. No ear rings were ever worn in the ears. There are two other children living today in this family. Neither of them has ever had the ears pierced, and neither one has the pitted ear lobe.

A Manual of Mothercraft

THE MOTHERCRAFT MANUAL, by Mary L. Read, B.S., Director of the School of Mothercraft, New York City. Pp. 440, price $1.25 net. Boston, Little, Brown and Co., 1916.

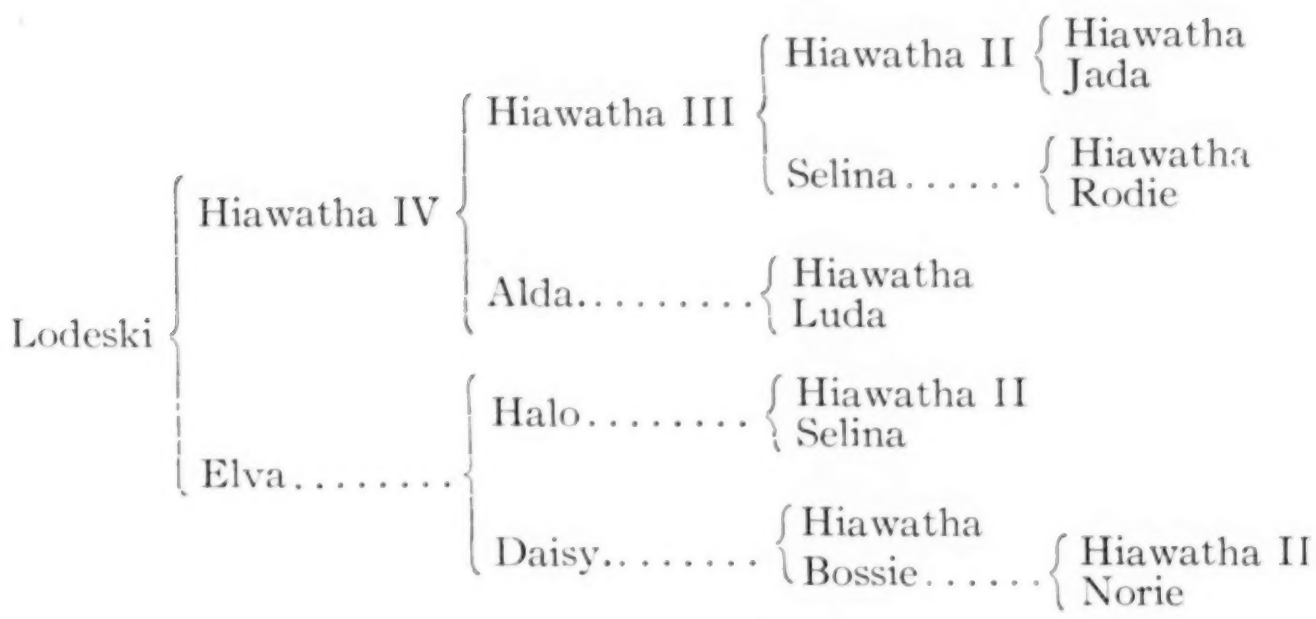
Mothercraft is defined by Miss Read as "the skilful, practical doing of all that is involved in the nourishing and training of children in a sympathetic, happy, religious spirit. It is not merely the care of the little baby; that is a very small, though significant, part. Its practice is not dependent upon physical parenthood, but is part of the responsibility of every woman who has to do with children as teacher, nurse, friend or household associate." The very comprehensive book begins with the selection of a mate and founding a home, and extends almost to the period of adolescence of the children, and within this period it is difficult to think of any phase of mothercraft which is not treated in considerable and definite detail. The remarks on eugenics are scant but suggestive. The low price and all-inclusive character of the work should make it widely used.

Progress of Eugenics in England

The eighth annual report (1915-1916) of the Eugenics Education Society (London) shows that its work is going ahead steadily in spite of the war—which has, indeed, produced "signs of an awakening national conscience in the sphere of eugenics." The society has endeavored to reduce the infant mortality, to check the spread of venereal diseases in the army, and to get a recognition for the interests of eugenics in new plans of taxation, so as not to penalize parenthood on the part of the fit. Several special courses of lectures have been given. In addition to its income from membership fees, the society has a guarantee fund amounting to about $2,000 annually. Maj. Leonard Darwin has been re-elected president.

LINEBREEDING

RICHARD H. WOOD
Heathwood Farm, Lewiston, Mich.



AN ILLUSTRATION OF LINEBREEDING

The animal Lodeski is linebred to Hiawatha. The blood of Hiawatha has been perpetuated and intensified. The only animals in the herd that do not carry Hiawatha blood are Jada, Rodie, Luda and Norie. But take notice that while Lodeski is strong in the blood of Hiawatha, she carries but a small percentage of the blood of Jada. She is not bred in line to that animal, but rather to her great grand sire Hiawatha. Mating Lodeski to any animal carrying Hiawatha blood will still be linebreeding with reference to him; his blood can be carried by either sire or dam and linebreeding continued. To make the matter more plain suppose that Jada is mated with a son of Rodie and the offspring is mated with a descendant of Luda and the offspring is then mated with Lodeska. Not one of these animals is related to Hiawatha, although they are related to each other and to Lodeski. The use of such offspring upon Lodeski would be inbreeding, to be sure, but it would not be linebreeding with reference to Hiawatha. This ought to illustrate that while linebreeding is always inbreeding there are many forms of inbreeding that are not linebreeding.

The theory of Mendelism is duly recognized by the writer, and he does not mean that the percentage of blood always indicates inheritance. His only aim is to bring about a better understanding of the meaning of certain terms or words used by breeders and experimenters.

THE term "linebreeding" is improperly used by many of the present day writers. It is often confused with "inbreeding." Even some of the editors of agricultural papers are using the two terms as though their meaning were the same. The proper use of a term is to express the idea that called for its original use. For many years prominent live stock breeders upon both continents have practiced inbreeding, which is any plan of mating in which sire and dam are what is called blood relations, in an undefined but fairly close degree. The number of combinations and permutations of inbreeding are almost beyond computing. One form of inbreeding is called "linebreeding." But many cases of inbreeding are not linebreeding.

Someone has said that linebreeding is a mild form of inbreeding, This is not always true. It may be a very intensive or close form of inbreeding.

The term linebreeding was used by the early breeders to cover only one plan of inbreeding. When one of the old time breeders found an animal, sire or dam, that possessed one or more characters that he especially desired to perpetuate, he bred that animal upon his own progeny or upon some animal closely related to him that resembled him in the desired points or characteristics. Such mating is the beginning of a system of linebreeding, and the offspring of such mating can be said to be linebred for that one generation. But to carry out a system of linebreeding so that future progeny can be

said to be linebred the results of each mating must be bred to animals closely related to the original sire or dam. One can readily see that animals can be closely inbred from generation to generation and still be carrying less and less of the blood of a certain ancestor, while by linebreeding the proportion of that blood can be constantly increased.

Felch's well-known chart of linebreeding is often misunderstood. Many see only the great number of combinations possible from one mating. The chart shows more than that: it shows how the blood of a certain pair of animals can be amalgamated. This is seen by following the central lines. But it also shows that by following a one-sided system the blood of either sire or dam can be increased and the tendency to transmit certain characteristics intensified. Breeding a colt back to his dam is inbreeding. It is also linebreeding with reference to the dam, but it is not linebreeding with reference to the sire. Now it would be easy to find plenty of animals related to the new colt and yet unrelated to the sire, and it is a gross error in such a case to say that linebreeding is the same as inbreeding. It is to be hoped that writers will continue to give these terms their true meaning, which will be done by using them as they were used by those who first coined them.

Whether the terms are used honestly and properly or ignorantly and fraudulently we can easily ascertain by asking the question: "To what animal is this animal linebred?" If the user of the term does not quite understand what it means he will hesitate before replying while if he is engaged in misrepresentation a glance at the written pedigree will show whether or not the blood of a certain animal shows all down the line and in every mating. Linebreeding is only one form of inbreeding.

A Biography of Luther Burbank

LUTHER BURBANK: HIS LIFE AND HIS WORKS, by Henry Smith Williams, M. D., L.L.D. Pp. 333, 40 illustrations, some of them in color. New York, Hearst International Library Co., Inc., 1915.

Mr. Burbank has not been wholly fortunate in his biographers, but Dr. Williams' well-made book is at least an advance over W. S. Harwood's amusing performance of 1907. It is entertainingly written, and can hardly fail to create in the layman an interest in plant breeding. If the layman then pursues his studies, he will quickly get rid of the false perspective and inadequate statements of the problems of plant breeding. No one, indeed, need hope to get a proper idea of genetics from the book, but he may get an interesting account of much remarkable work, and in the concluding chapters some sensible observations on eugenics, although the parallels between plants and men are too closely drawn. Many of the illustrations are admirable.

Some Sweet-Pea Hybrids

What are believed to be the first species-crosses on record of the sweet pea (*Lathyrus odoratus*) are described in the *Gardeners' Chronicle* (London, September 30), by B. T. P. Barker. The only successful one of many attempts was with *L. hirsutus*, which differs little from the sweet pea. The first-generation hybrids were weakly and somewhat intermediate between the two parents; the second, third and fourth generations showed a little segregation of characters, but not much. These hybrids seem to have little commercial value, but attempts are being made to use them as "bridging species" for wider crosses.

THE GREAT UNMARRIED

A Review

WE COUNSEL marriage strenuously with one breath, Walter M. Gallichan complains, and impose hindrances to practice with the next. He has therefore written a book urging that we counsel marriage still more strenuously, and that we at the same time remove some of these hindrances to practice.

In so doing, he has shown himself to be a constructive eugenicist. His statistics are sometimes unsound; but statistics are a small part of his book. The "authorities" he cites are not always authoritative; but his book does not depend on the citations of authority. He has written an eloquent plea for a more eugenic view of marriage; his plea is marked by restraint and delicacy of feeling, and he puts forward no wildly impracticable ideas. It is written in a spirit of sanity and upbuilding that deserves commendation.

Mr. Gallichan's analysis of the causes and extent of celibacy offers little that is new, and being English in origin, is not always applicable to conditions in the United States. He balances sympathetically the justifiable and unjustifiable reasons which lead men to remain unmarried: selfishness, the desire to get along in one's profession, the fear of supposed feminine extravagance, and incompetence—economic causes, in general. The enforced celibacy of women is the natural consequence of the celibacy of men; most women, he thinks, would marry if they had the opportunity.

This postponement or avoidance of marriage naturally brings many evils, but he has little patience for those who merely wish to suppress the symptoms of the disease without attacking the causes. "If some of the activity applied to the attempted suppression of sexual vice were devoted to making the path of sexual virtue less difficult, great triumphs for the moralist would ensue."

WHAT ARE THE REMEDIES?

But the widespread postponement of marriage, and the various evil consequences of it, are well-known to eugenicists, who will be most interested in Mr. Gallichan's answer to the question, "What are the remedies?" He first dismisses as wholly impracticable three that have been suggested: (1) polygamy, (2) free love, (3) taxation of bachelors. The latter proposal, he remarks, "is typical of the disposition to tinker with an abnormality instead of seeking down to its source and striving to annihilate it. The reformers take it for granted that the bachelor is an anti-social individual who selfishly abstains from marriage and parenthood. This is only true of a percentage of well-to-do single men. The larger proportion of bachelors are single through necessity, not from deliberate preference. Obviously it would be unjust to tax those who are already debarred, through economic reasons, from entering matrimony. Taxing the rich bachelor would not encourage him to marry. . . . The best way to diminish the number of bachelors is to adapt marriage to the present needs of the community by removing formidable hindrances to the altar."

The first hindrances which must be removed are the economic. He discusses:

(*a*) The necessity for a living wage.

(*b*) Cooperation or profit-sharing schemes.

(*c*) Development of the resources of the land—a "back to the land" movement.

(*d*) Maternity grants or other state aid for motherhood. He does not discuss this in detail, but his attitude in other portions of the book shows he

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[1] The Great Unmarried, by Walter M. Gallichan. Pp. 225, price $2.25 net. New York, Frederick A. Stokes Company, 1916.

is fully alive to the dangers of indiscriminate aid, and realizes the need of quality, not quantity, in children.

(*e*) Communal, municipal, or group nurseries, which "might be adopted in particular cases, to meet the need of working people."

(*f*) The adoption of the system of dowries, as it is practiced in France: "the *dot* gives a sense of independence to brides and proves an assistance to the newly married pair at the outset of matrimony. . . . There is now in England some indication that the *dot* system is becoming a practice among those parents who purchase endowment for daughters by insurance."

(*g*) "Of the many factors militating against marriage and the reproduction of offspring in the vigor of life, exorbitant rents and the widespread and increasing house-famine rank among the most formidable and grave."

"We may now summarize the suggested economic remedies as (1) the raising of wages to a minimum standard for the adequate support of the parents and a moderate family; (2) provision of a large number of cheap and sanitary houses in town and country; (3) the encouragement of small farming and rural life; (4) the introduction of the endowment of daughters for marriage; (5) the granting of bonuses to parents who are willing to raise good-sized families."

Whether or not one thinks the suggested remedies would do what is expected of them, it must be admitted that they are not revolutionary in character. Mr. Gallichan remarks that others of the nations engaged in the Great War are considering the problem; that Russia has decided to permit the marriage of girls under 16, in special cases, and that Germany is considering "a vigorous government matrimonial policy [which will] encourage men to marry young and enable working women and girls to marry without giving up their occupation, perhaps by inaugurating 'half days' for working wives."

SOCIAL REMEDIES

The above supposed remedies could be adopted by the process of lawmaking; Mr. Gallichan points out, however, that public opinion must first be aroused. The "social remedies" are no less important, and must depend wholly on public opinion. Among them he enumerates:

1. More "temperance" in work. Too great a devotion to business is "inimical to love and to marriage in the best years of life. . . . We do not even recognize love as a finer passion than money greed. It is a kind of luxury, or pleasant pastime, for the sentimentally minded. Love is so undervalued as a source of happiness, a means of grace, and a completion of being, that many men would sooner work to keep a motor car than to marry."

2. A new valuation of love. We must study it and understand it; we must overcome our idea that it is not a proper subject for conversation; we must learn to value love as sacred, if marriage and parenthood are to attain true dignity in our minds.

3. The teaching of the proper kind of sex hygiene.

4. A simplification of life would be a great stimulus to marriage at the suitable age. "Slavish worship of acquisition and possession stands in the way of a realization of life."

5. Training of women in domestic economy and mothercraft. Girls should be educated for marriage as boys are trained for business.

6. Greater respect for the individuality of women, on the part of men, so that no woman shall shrink from marriage with the idea that it means a surrender of her personality and a state of servitude. Truer idea of sex-equality. This would include recognition by men that women are not necessarily creatures of inferior mentality.

7. "The fanatical respect for social caste is one of the checks upon marriage, especially among women. So long as the caste system is observed with fetichistic ardor, the woman of the 'gentlefolk' genus, who is out of sympathy with suitors of her own class, will always find the range of selection extremely restricted. Possibly in the remote future the aristocracy of character and intellect will be the only

recognized caste, and mere birth, without the prestige of virtue and wisdom, will count for nothing."

In short, "the social remedy for readjusting the tendency to defer marriage long after the attainment of the adult age, is the diffusion of healthier views of the conjugal relation, accompanied by a reconsideration of the essential question of pecuniary means." "Industrialism and commerce must be adjusted to life, and not permitted to kill all that constitutes living."

HIS VIEW OF US

Mr. Gallichan's remarks on a needed change in divorce laws apply more to England than to the United States. What he thinks of our own lawmakers is worth knowing:

"In the United States the attitude to the sex question is curiously variable. Some of the social views and legal enactments are sanely conceived and equitable, while others are monstrously ridiculous and futile. On one hand, we have such inept regulations as that which prohibits a pair of lovers from decorous fondling in the public parks; and on the other hand we find many instances of a breadth of rational opinion concerning sexual instruction for the young. There is the tyrannous Puritanism that bans scientific inquiry into the psychology of sex, and permits a post-office censorship of serious books in transit; and there is the growing interest in, and the encouragement of, research in the neglected department of sex-hygiene. There are wild measures for the suppression of vice, and entirely sane official inquiry into the causes, the conditions, and the prevention of prostitution. America affords instances of excessive prudery and of frank, seemly investigation. Books are banned in the United States; but some that are suppressed in England are sold openly in America.

"Divorce law in the United States, although by no means universally equal throughout all the States, is fairly humane and broad. Careless critics of marriage reform often point to America as the country of frequent and widespread divorce. The truth is entirely contrary to this assumption. Taking the whole of the population, divorces in America are not even 1%. It should be remembered that New England, the home of Puritanic morality, was the birthplace of reform in the matter of divorce. Freedom of divorce is not a factor of immorality."

To return to Mr. Gallichan's "social remedies," it will be observed that they are on the whole of the same general character as those that Americans, facing quite different problems to those of the Englishman, have urged. Mr. Gallichan feels that if those who have this attitude make it persistently known, they will win the day.

A PROPAGANDA OF MARRIAGE

"The propaganda of marriage must be well planned and the instruction graduated. Above all, the advantages of wedlock should be insistently urged, and the evils of celibacy and the counterfeit celibacy vividly illustrated. . . . The fine ideals of love and marriage, as presented in the highest forms of art, and in the biographies of the happily wedded, should be taught as history is taught in the schools."

"We have ardent crusaders against vice, but where are the propagandists of one of its antidotes, marriage? What publicist of note, what cleric, what statesman has suggested a campaign for the promotion of matrimony?"

"The true, intimate chronicle of an everyday married life has not been written. Here is a theme for genius; for only genius can divine and reveal the beauty, the pathos, and the wonder of the normal or the commonplace. A felicitous marriage has its comedy, its complexities, its element, too, of tragedy and grief, as well as its serenity and its fealty. Matrimony, whether the pair fare well or ill, is always a great adventure, a play of deep instincts and powerful emotions, a drama of two psyches. Every marriage provides a theme for the literary artist. No lives are free from enigmas.

"Art might be more often employed in the service of Hymen, in the laudation rather than the criticism and condemnation of marriage. It is well to use the

novel as a popular medium for the revelation of life; and works of fiction exposing the inequalities and the defects of conventional marriage are moral sermons in disguise. But wedded love is not only a poetic dream. It exists in spite of scepticism. Love in novels usually ends at the altar. Apparently the bulk of novelists cannot conceive that our interest may be held by a recital of conjugal love."

The church has also failed to live up to its possibilities in its attitude toward matrimony, Mr. Gallichan believes. It should share with art the task of setting high standards and helping men and women to reach them.

SOUND ETHICAL TEACHING

"The historic crusade with impurity has failed, because purity, in its true sense, has not been defined and incessantly promulgated as the happier mode of living. A child is wont to question why he should obey the counsels of his parents; and the wise parent will endeavor to convince the child that obedience of the moral rule brings satisfaction, whereas infringement brings penalties and unhappiness. Every intelligent mind asks the question, 'Why should I act in this way, and refrain from acting in that way?' Positive ethical teaching essays to provide a convincing answer to such rational inquiry. Moralists should endeavor, therefore, to convince that the path of purity, or the state of marriage, though not immune from difficulties and trials, is less perilous and more tolerable in the long run than the path of impurity, or the state of libertinism, and that virtue is not always painfully laborious. This might be proved on utilitarian grounds. There is evidence enough that, as most persons marry, and that many marry more than once, the majority find at least a fairly high degree of felicity in wedded life. I have shown that the married live longer than the celibate; that they preserve higher health of body and mind, and are less subject to neuroses and psychoses; and that conjugality develops restraints and virtues that tend to the well-being of society.

"All counsels of sex-morality must be savored with practical reason, and made positive and explicit. It is futile to offer marriage as an alternative to a supportable single life, or as a substitute for pseudo-celibacy, unless marriage is represented as more alluring than these conditions. Wedlock should be regarded as a truly great and noble social sacrament, and not as a way of escape from sin, a life of material comfort, or a mere custom of respectability. Esteem for marriage must be inculcated in order to counteract disesteem and reluctance to marry. The potential worth of marriage is only recognized by those who think clearly and deeply upon the subject. Yet the mass of men and women who enter lightly into this momentous partnership are profoundly ignorant concerning its character and the innermost feelings of one another. This may seem extravagant to all except those who have devoted close inquiry and observation. There are still millions of people who think that instinct, or play of sex-attraction, is the beginning and the end and the totality of love and marriage, and that if we 'follow our instincts we cannot go far wrong in the realm of Eros.' No greater fallacy exists. Is there a sane man who relies upon his 'instincts' in business affairs?"

NEED OF KNOWLEDGE

"Men are not taught to understand women, and women are not taught to understand men. Without even the most rudimentary knowledge of comparative sexual physiology and psychology, how can the sexes hope to understand each other, and to live harmoniously, morally, and sanely, in wedlock? Many men know more of the psychology of the horse than of woman. A woman who drives a motor-car has at least some knowledge of its mechanism; but many women who take husbands for life know nothing whatever of masculine organization."

"We fall in love instinctively; but we cannot instinctively alone make a success of marriage and the passing on of the flame of life to our children."

"The promotion of marriage in early

adult life, as a part of social hygiene, must begin with a new canonization of marriage. This is the task equally of the fervent poet and the scientific thinker, whose respective labors for humanity are never at variance in essentials. . . . The sentiment for marriage can be deepened by a rational understanding of the passion that attracts and unites the sexes. We need an apotheosis of conjugal love as a basis for a new appreciation of marriage. Reverence for love should be fostered from the outset of the adolescent period by parents and pedagogues. The spiritual import and the beauty of the love of the sexes should be revealed, and a sense of worship instilled in young minds."

"From rude, primitive sexual pairing there has grown a supremely entrancing and tender idyllism that is the most potent of all spiritualities and a strange miracle of daily life. The true votary and venerator of marriage is the man or the woman who strives through knowledge to elevate marriage, and to make that state holy and exemplary."

The Fundamental Work on Measurement of Intelligence

THE DEVELOPMENT OF INTELLIGENCE IN CHILDREN, by Alfred Binet, D. Sc., and Th. Simon, M.D. Translated by Elizabeth S. Kite. Pp. 336. Price $2.00. Publications of the Training School at Vineland, N. J., Department of Research, No. 11, May, 1916.

THE INTELLIGENCE OF THE FEEBLEMINDED, by Alfred Binet, Sc.D. and Th. Simon, M.D. Translated by Elizabeth S. Kite. Publications of the Department of Research, the Training School at Vineland, N. J., No. 12, June, 1916. Pp. 328. Price $2.00.

The Training School has done a real service by publishing these two volumes, which contain a translated collection of practically everything that Drs. Binet and Simon wrote on the measurement of intelligence. The first volume contains a complete explanation of the scale in its various stages of evolution; the second shows the operation of the scale in the hands of its authors as they used it in the study of the feebleminded, dements, and speech defects.

The Binet-Simon tests are so familiar now that it is hard to realize that the first publication on them dates back only to 1905, and that it was several years later that they were first heard of in America, when Dr. H. H. Goddard, who contributes an introduction to the first of the above volumes, had made use of them in his own work with successful results. Many of the criticisms since made would never have been made if the complete work of Binet and Simon had been known, and the present publications should serve to place the measurement of intelligence on an even more solid foundation than it at present has.

Mental Effects of Inbreeding in Rats

Albino rats inbred for a dozen generations have been tested at the Harvard Psychological Laboratory by Mrs. Ada W. Yerkes, with a view to finding whether they differ mentally from rats that are not inbred. They were studied in a maze, and the distances they traveled and the time they required to find their way through were noted. The conclusions presented in the *Journal of Animal Behavior* (Vol. vi, No. 4) show, in general, a little more slowness in learning on the part of the inbred rats. "This slowness seems chiefly to have been due to a greater timidity and a greater susceptibility to environmental conditions." In some tests, however, the inbred rats excelled. The study does not, of course, show that inbreeding *necessarily* produces any mental or physical inferiority. If there were inheritable factors for timidity, the inbreeding would intensify them and distribute them to all the rats, which might result in such conditions as Mrs. Yerkes found.

EXCEPTIONAL FECUNDITY AND LONGEVITY

HENRY M. JONES, *Lexington, Ky.*

THE picture herewith presented and the history of the subject should be of special interest to breeders of horses. It is an impressive lesson to young breeders that before selecting breeding stock a thorough historical knowledge of the family is imperative; that no animal can found a great family that does not live a long life and produce many young; that fecundity and longevity are racial characters, therefore inheritable, though in varying degree.

The subject of this sketch is the chestnut mare Mantua Maker by Red Wilkes 1749, dam Milliner by Harold 413, foaled May 22, 1891, and now 25 years of age. The foal is a bay filly foaled July 22, 1916, by General Watts (3) 2:06¾ and is the twentieth foal of her dam, each of which has come by single birth. The complete list follows:

June 3, 1895, ch f Junie Fleetwood by Simmons.
June 4, 1896, ch c Wanamaker by Simmons.
June 2, 1897, b c The Major 2:13¾ by Dr. Hooker.
June 10, 1898, b f Ruth Paddock by Dr Hooker.
Not bred in 1898.
April 22, 1900, b c Richmond by Dr. Hooker.
April 11, 1901, b f Summer Morn by Electric Bell.
March 27, 1902, b c Wiltondale 2:20¼ by Adbell.
April 19, 1903, ch f Kentucky Girl by Constantine.
April 26, 1904, b f Priscilla Bond 2:24¼ by The Bondsman.
1905 missed to Prodigal.
March 25, 1906, b c De Soto 2:27¼ by The Bondsman.
March 22, 1907, b f Merrie Todd 2:23¼ by Todd.
April 27, 1908, b c El Vivillo 2:14¼ by Libretto.
March 31, 1909, ch f Rosanante 2:22¼ by Libretto.
March 26, 1910, ch c Don Jaime 2:20¼ by Libretto.
March 26, 1911, ch f Ruth Coleman 2:17¼ by San Francisco.
April 11, 1912, ch f Modiste by General Watts.
April 4, 1913, ch f Clara Coleman 2:24¼ by San Francisco.
April 29, 1914, ch f Mistle Thrush 2:19¼ by Axworthy.
June 4, 1915, b f Mary Frances Gay by General Watts.
July 22, 1916, b f ..... by General Watts.

There is so much of interest in a thorough study of this mare's history and record that minute detail does not become tiresome:

1. An exceptionally high fecundity.
2. Correlation of fecundity and longevity.
3. Inheritance of both characters.
4. Correlation of œstrus and fecundity.
5. Effect of environment upon fecundity.

Available records do not show another trotting bred mare that has produced twenty foals. She was bred first when 3 years old and produced four consecutive foals, each of which came in the month of June. In 1898 she was not bred, it being desirable to have the foals come earlier. She then produced five consecutive foals and in 1905 missed to the cover of Prodigal. These foals came each year in the months of March and April. Since this she has produced eleven consecutive foals, each of which came in the months of March and April except the last two, one of which came in June, the other in July, the result of having broken service in each of the last two years, at that most critical of all periods, the seventh and eighth week. Prior to this she had never broken service since foaling. She has been again bred and as her physical condition is most excellent there is every reason to hope that she will produce other foals. The writer defines high fecundity as the ability to carry a large number of fœtuses to successful parturition and rear the foal to six months of age. This would seem the highest standard by which to judge.

MANTUA MAKER AND HER TWENTIETH FOAL

No other case has been found on record, of a trotting bred mare producing twenty foals; but Mantua Maker, above shown, appears likely to produce several more before her career of usefulness is ended. At the present time she is 25 years old. She was bred and has been owned throughout her entire career by Henry M. Jones, who has therefore been able to keep full data concerning her and her progeny. She comes of a fecund strain, and appears to have transmitted this valuable quality to her own offspring. Such strains are of great value to the livestock industry, and every breeder should try to find them and utilize them. (Fig. 8.)

She has reached this standard with eighteen of the twenty foals, the foal of 1912 having died, by an accident, when seven days old, and the last one has not yet reached the age.

The records show that the greatest trotting stallions lived from twenty-three to thirty-four years. While the records are not so accurate on mares, still the very greatest of them have lived long lives.

That this mare inherited longevity and fecundity is proved by the records. Her sire, Red Wilkes, died at 30 and sired 178 with standard records. His sons sired 1,037 and his daughters produced 312. Her grandsire, George Wilkes, died at 26, sired 83 standard performers; his sons sired 3,204 and daughters produced 209. Her great grandsire, Hambletonian, died at 37 after siring 40 standard performers; his sons sired 1,717, while his daughters produced 119. His sire, Abdallah, lived to be 31. Harold 413, sire of her dam, died at 29; and her fifth dam, Black Rose, has more than 2,700 descendants.

These facts are substantial proof that she inherited longevity and fecundity and it is further evidenced by the fact that these characters have been transmitted to her offspring, as the writer still owns her first two foals, which are hale and hearty at 21 and 20 respectively, and knows positively that eighteen of her twenty foals are now living. Her first foal, Junie Fleetwood, at the age of 16 had produced twelve foals, when pathological conditions arising at the birth of twins put an untimely end to her breeding career. Her granddaughter, Solferino, has produced seven foals and is now 11 years old and in the height of her breeding career.

The correlation of œstrus and lactation with fecundity has been carefully studied by the writer during thirty-five years experience in breeding horses. Indubitable evidence has been found that mares above the average in fecundity have a prolonged œstrum and highly developed mammary glands. This mare had the first œstrum when eight months old, which lasted six days and has never been of shorter duration but has sometimes lasted ten days. The mammary glands are so highly developed that 1 gallon of milk has been taken from her when weaning a foal. These characters have been transmitted to her daughter and by her to the granddaughters.

INFLUENCE OF ENVIRONMENT

Without entering into a discussion of the effect of environment upon the germ cell, we may say that the fullest expression of fecundity in this case is due in a great measure to environment. She has been given a wide range on blue grass land, underlaid by Trenton limestone, and fed upon grains produced by the same lands, so rich in phosphates. She has never been permitted to become thin in flesh and has had a roomy, well-ventilated box in winter. Her teeth have been dressed once each year and when foaling she has had the same care that would be given a mother in a maternity hospital. A practical experience of many years aided by dissection of subjects of various ages and physical condition has convinced the writer that the 40% of all mares bred that fail to produce foals can be materially reduced by impressing upon breeders the effect of environment upon the germ cell.

ALL BREEDERS SHOULD KEEP RECORDS

The unusual record of Mantua Maker as a producer carries a valuable lesson for all livestock breeders. A mare which can fulfil her obligation to posterity year by year as this mare has done, and at the same time keep the good health and sweet, benign disposition which her photograph shows, deserves something of the same respectful homage which all true men pay to the noble human mother surrounded by a troop of sturdy sons and daughters.

Livestock breeders will do well to hold the producing females as long as they produce. Fecundity is unquestionably inherited, and while it is not manifested so emphatically in the case of mares as in other farm animals, it is one of the powerful factors which the breeder has at his command. Simple produce records can be kept by every farmer and breeder, and will soon show which are the best producing individuals and which the most productive strains in the herd. By weeding out the non-producers, the factor of fecundity can be increased in the herd and its efficiency greatly augmented.

It would be interesting to know of other cases of high productiveness like that of Mantua Maker.

GEO. M. ROMMEL,
Secretary, American Genetic Association.

The Transmission of Rabies

Under the misleading title of "Studies on the Heredity of Rabies," Daniel Konradi describes in the *Annales de l'Institut Pasteur*, XXX, 33–48, his researches at the Institute of Pathology and General Therapeutics at Kologsvár, Hungary. It appears from a summary in the *International Bulletin of Agriculture* that rabies is transmitted by the mother to the fetus, but is attenuated in the process. Experiments are cited with dogs, rabbits and guinea-pigs; the latter are the most susceptible. Such a transmission is not inheritance, and much confusion has been caused in the study of heredity in the past, because of carelessness in ruling out cases of transmission to embryo from the mother.

HARVARD AND YALE BIRTH RATES

Graduates of Men's Colleges Do Not Make Satisfactory Showing, But Are Yet 50 to 100% Ahead of Graduates of Women's Colleges

THE inadequate marriage and birth rates of the graduates of the great women's colleges of the United States has often been pointed out by eugenicists. In many cases the apologists of the women's colleges have replied that these rates merely reflected the situation of the class from which college girls come, and charged that the graduates of the large men's colleges of the East would be found to have an equally bad showing. It was more than once alleged that the men, not the women, were to be blamed for the race suicide of this educated class.

Until now, there have been no adequate studies of the marriage and birth-rates of the large universities for men in the eastern United States. Dr. John C. Phillips has met the need by a very careful study of the figures of forty years at Yale and Harvard. He shows that their graduates marry in at least 50% more cases than do the graduates of the large women's colleges and, what is still more important, that the number of children per graduate is from 50% to 100% greater.

Dr. Phillips has published[1] an account of his research, which is given slightly condensed, herewith:

"My attention was called to college birth rate by reading the various papers in the JOURNAL OF HEREDITY on 'Race Suicide,' and the birth rate of the graduates of women's colleges. There did not seem to be any data of the same sort for the larger men's colleges, and I was particularly interested to see whether the rate had changed in recent years. The only available source from which to extract this information for Harvard University was the class reports. Harvard and Yale are here considered in the same way. In the case of Harvard the reports became fairly trustworthy for the Class of 1853, and for Yale they were usable back to the Class of 1850. I did not attempt to record births later than the Class of 1890, for the twenty-five year report of this class was just published at the time this work was done (summer of 1915), and earlier class reports are of little interest where the total number of children is sought for.

"All the figures involved in making up the final averages are based on class reports. All the available reports of every class have been tabulated and each name checked up on each report. Only those men whose records were fragmentary were left out, and this omission has the following tendency. It vitiates the two divisions, 'Children Born per Graduate' and 'Children Surviving per Graduate.' The effect is to lower slightly both these figures, for a few graduates with no history or only partial history appear here as having no children. This was necessary in order to get a true index of the birth rate of married graduates, but, as will be seen later on, the error is extremely small except in the first decade of Harvard records. It does not affect at all the columns 'Children Born per Married Graduate' and 'Children Surviving per Married Graduate.' These last are the items which interest us most, because the percentage of graduates who have married is a nearly constant one in the forty years included in this study.

"It is only necessary here to summarize the work in terms of decade averages for each college, and I have attempted to answer the following questions: What per cent of graduates of Harvard and Yale marry? How long after graduation do they marry, and has this interval changed? How many children does each married graduate

[1] In the Harvard *Graduates' Magazine*, XXV, No. 97, pp. 25–34, September, 1916.

have, and how much has this number diminished in the forty years under consideration? What per cent of marriages are childless?

CRITICISM OF DATA

"I now wish to criticize the data about to be presented. The column 'Average Number of Graduates' is based on the total number of graduates for each class, whether or not adequate future family history was available. The next columns, 'Average Number Married,' and 'Per Cent Married,' are based on the total number known to be married for each class. It is a little under the correct figure, because some of the lost men may have been married: but the error is very small except for the first decade for Harvard, classes 1853-60. In this decade 20.7% of the names were thrown out, injuring to a considerable extent the records for this period. In the next decade only 1.2% of the total names were found wanting; in the next 3.2% and in the last only 1.9%. Thus the total average error is very small. The Yale reports are even more reliable, but the percentage of 'lost' men has not been figured for Yale college.

"The next column represents the

TABLE I.—*Harvard.*

Decade	Average No. of graduates per class	Average No. married	Per cent married	Interval in years between graduation and marriage	Average No. of children born	Average No. of children per capita per married graduate	Average No. per capita per graduate	Average No. of children surviving	Average No. per capita per married graduate	Per capita per graduate	Average No. of childless marriages	Per cent of childless marriages
1851-60 Average of 6 years	90.8	49.2	.68	8.9	151.8	3.13	1.68	122.5	2.52	1.36	4.3	7.8
1861-70	101.9	77.3	.76	8.5	203.2	2.62	1.98	173.3	2.24	1.69	14.2	18.6
1871-80	157.5	115.4	.75	9.0	256.4	2.23	1.63	229.8	2.0	1.46	25.9	22.5
1881-90	248.	183.	.76	8.3	372.3	2.06	1.55	345.8	1.91	1.44	43.6	23.4
Grand average.	149.5	106.2	.74	8.7	245.9	2.51	1.71	217.8	2.17	1.49	.....	.....

TABLE II.—*Yale.*

Decade	Average No. of graduates per class	Average No. married	Per cent married	Interval in years between graduation and marriage	Average No. of children born	Average No. of children per capita per married graduate	Average No. per capita per graduate	Average No. of children surviving	Average No. per capita per married graduate	Per capita per graduate	Average No. of childless marriages	Per cent of childless marriages
1850-59 Average of 9 years	98.	75.	.78	7.5	247.1	3.32	2.53	196.1	2.64	2.0	10.5	14.3
1861-70	107.6	86.4	.81	7.8	233.6	2.69	2.16	197.8	2.28	1.83	16.4	19.1
1871-80	120.5	94.5	.79	8.5	211.9	2.23	1.75	181.9	1.92	1.51	20.3	21.7
1881-90	135.9	101.7	.75	8.2	207.6	2.04	1.53	189.8	1.87	1.40	21.3	21.0
Grand average.	115.5	89.4	.78	8.	225.1	2.57	1.99	191.4	2.18	1.69	.....	.....

interval in years and fractions of years between graduation and marriage. This is strictly a true figure, but it is only of relative interest. If we do not know the age at graduation, we do not know the age at marriage, and this is of particular interest in determining whether marriage has been postponed, and if so, how much. To answer this I have computed age at graduation at Harvard for two five-year periods, 1861-65 and 1886-90. For the first period the age is 21.8 years and for the last 22.8 years, a difference of one year. We can say then, since the interval between graduation and marriage has been a nearly constant one for 40 years, that the graduates married only one year later during the latter part of the period than during the earlier part. Strictly speaking, the age has increased from a little over 30 years to just about 31 years. This was a rather unexpected result, for it is commonly supposed that the age of marriage of professional men has advanced very much. Hankins, however, showed[2] that our native population from native parents marry earlier now than they used to. The uncharted period since the Class of 1890 may show a slightly greater age at marriage, but it is unlikely that there will be a marked change.

"The 'Average Number of Children Born per Capita per Married Graduate' is the next column, and this is very close to a perfect figure, because it is based only on those individuals who had a clear record, and there were not enough names discarded to vitiate the result.

"The 'Average Number of Children per Capita per Graduate' is a true index, except that it is slightly under the real figure. It is obtained by dividing the total number of children born by the total number of graduates for each class and decade.

SURVIVING CHILDREN

"The next three columns have to do with surviving children. They represent the children who grew up to at least several years of age, and in most cases escaped infant mortality. These figures are based on the children surviving at the last report for the class in question. The twenty-fifth report is in all cases the earliest report consulted. For the four decades at Harvard we have latest reports averaging as follows: First decade, 48 years; second decade, 43.7 years; third decade, 32 years; fourth decade, 26 years.

"The question arose at this point: How old were the children of graduates at the time of the twenty-fifth year class report? To answer this only one period, 1886–90 for Harvard, was computed. The average was found to be 13.1 years, showing that most of the children were past the dangers of the first five years of infancy at the time of the twenty-fifth year class report, and liable only to the much lower death-rate of advanced childhood. Also it may be noted that the twenty-fifth year report includes very nearly all the children born to the class. I wrote, however, to several class secretaries and it appears from these letters that only thirty-five children have been born to the classes 1881, 1882, 1889 and 1890 since their twenty-fifth year reports. This is only about 2% of the total born to these classes before the twenty-fifth year report, so that we can safely accept all twenty-fifth year reports, where this is necessary.

"The last two columns show the average number of childless marriages in each class, for each decade, and also the per cent of childless marriages in each decade. The figures will be found inaccurate for the first decade of Harvard graduates. All the others are reliable.

"The mass of data from which this report is drawn would make a large book. In working it up, 5,618 names were considered for Harvard and 4,522 for Yale. I have, therefore, thought it best to give only two final tables representing all the figures just considered, but showing only grand averages for the four decades between the classes of 1850 and 1890 for each college. There does not appear to be anything in the

[2] JOURNAL OF HEREDITY (1914), Vol. v, pp. 361–7.

yearly tables which does not show just as well in these decade tables."

YALE SURPASSES HARVARD

"It is scarcely necessary to call attention to these two tables; the falling birth rate is shown in all four columns where children are considered. Roughly, the number of children born per capita per married graduate has fallen from about 3.25 in the first decade to 2.50 in the last decade. The per cent of graduates marrying has remained about the same for forty years, and is a trifle higher for Yale; but the low figure, 68% for the first decade of Harvard, is probably due to faulty records, and must not be taken as significant.

"The next most interesting figure is the 'Children Surviving per Capita per Graduate.' This has fallen from over 2.50 to about 1.9. The per cent of childless marriages increased very markedly during the first two decades and held nearly level for the last two decades. For the last decade at Yale it has even dropped slightly, an encouraging sign. It is worthy of note that the number of children born to Yale graduates is almost constantly a trifle higher than that for Harvard, while the number of childless marriages is slightly less.

"Sprague[3] calculated that among American stock of the East the families must average 3.7 children 'for every mother who demonstrates any ability to bear offspring.' According to him every married woman bearing children must bring three to a marriageable age. He says that 15% of the stock he studied (New England) did not marry, or married too late, and that 20% of marriages produced no children. We have seen that 22 to 25% of Harvard and Yale graduates never marry, and that 19 to 23% of marriages are infertile; therefore, on Sprague's basis every married graduate having children must average a little more than three surviving children to perpetuate the stock.

"It is not my purpose here to suggest reforms or to analyze causes. I think every one in every walk of life will agree that the college graduate should at least perpetuate himself. Many of us disagree as to the eugenic ideal, for there is no single ideal possible, but all must admit that college men are at least fair samples of American manhood. The causes of the great decline in birth rate are almost world-wide, and they concern the economist, the psychologist, and the physician. Reform must come from within, not from without, and it will be brought about by a sterner sense of duty and a realization that the vain stampede after pleasure for pleasure's sake is leading us only to restlessness and discontent.

"Before concluding it will be well to compare the results of this study with the only investigation which gives us any real light upon the birth rate of the old American stock. I refer to the 'Report of the Immigration Commission,' Vol. 28. Here are a few of the facts touching on birth rate of Americans.

"Among American women under 45 years of age who had been married ten to nineteen years, 13.1% were sterile (childless): in Rhode Island, 17.5 to 19.4%; in rural Minnesota, 5.1%; and in the city of Minneapolis, 12.7%.

"Considering the number of children among this category of married American women, we find table III based on nearly 16,000 individuals from various sample districts.

"According to the 'Report of the Immigration Commission' native American stock cannot be holding its own in the East or in the cities of the Middle West. In the rural districts of the Middle West the women have just one more child each than in the urban districts, and this rural stock may be said to be a little more than holding its own. The birth rate in the South is supposed to be much higher.

"In Massachusetts the State report, *Births, Deaths, and Marriages*, for the twenty-five years ending 1911, shows us that the deaths among the native-born population exceeded the births among the native-born by nearly 270,000.

[3] JOURNAL OF HEREDITY, Vol. vi (1915), pp. 158–62.

During the same period the total births in families having foreign-born parents exceeded the total deaths by nearly 527,000. Comment is unnecessary.

TABLE III.—*Children of American-born Women of 45 Years or under, Married Ten to Nineteen Years. (Second Decade of Married Life.)*

	Rhode Island	City of Minneapolis	City of Cleveland	Rural Ohio	Rural Minnesota	Whole Area
Number of children	2.7	2.4	2.4	3.4	3.4	2.7

"The birth rate of college women is quite the most pathetic spectacle of all. Johnson and Stutzmann showed[4] that for Wellesley College, period 1879–88, only about half the graduates married and that the mothers had only 1.56 children each. Per graduate there was but .86 of a child each. Among the honor girls (Durant and Wellesley scholarships) those that married had about half this number of children, or just about half a child each!

"It is the writer's hope that these pages may fall among some readers who will take serious thought of the lesson they teach. Each generation has new duties and new distractions, but amidst the whirl of modernism let us not forget the oldest duty of all, that of the fathers and mothers of America in their care for the future of their country and the ideals of their race."

Prosperity and Eugenics

As people become more prosperous, there is a general tendency for their birth-rate to decrease. Now it is well for a nation that its people should have a reasonable amount of material comfort; but it is ill for a nation if their material success, which in itself is usually an evidence of some ability, leads to race suicide. The balance of these factors, therefore, gives justification to a question that at first sight seems paradoxical: "From the standpoint of eugenics, is it dangerous for the nation that its citizens should be morally and socially uplifted?"

The Berlin Race Hygiene Society has been asking this question for some time, but without getting an answer that balanced the advantages and disadvantages in a satisfactory way. Five years ago it offered a prize for the best essay on the subject, and a number of papers were sent in, but none was considered of any merit, save one on the Jews by Dr. Felix A. Theilhaber; and as the author later withdrew this paper, the prize was never awarded. Dr. Theilhaber reworked his contribution into two books: "Das sterile Berlin" (Berlin, 1913, Marquard), and "Der Untergang der deutschen Juden" (München, 1911, Reinhardt). The Berlin society has now renewed its prize offer and has received a dozen or more papers; a member of the American Genetic Association, who has examined these papers, observes that none of them appears noteworthy. The contest has not yet been closed.

Plan to Propagate Wild Game

A group of Chicago men is buying 10,880 acres of land in Wisconsin for a game farm, according to a letter from A. B. Hulit, secretary of the American Wild-Life Association, 175 Jackson Blvd., Chicago. The plan is to propagate all sorts of animals suited to that climate, such as elk, deer, moose, caribou, bison, and smaller fur-bearing animals, as well as some birds. The work of the American Wild-Life Association is described as (1) arousing public sentiment for the better protection of wild life; (2) cultivating among school children and others a better knowledge of the habits of birds and animals; (3) formation of cooperating State and local organizations; (4) securing protective legislation; (5) maintaining a bureau of information. Samuel Evans (of the Wallace Evans Game Farm, St. Charles, Ill.) is president.

[4] JOURNAL OF HEREDITY, Vol. vi (1915), pp. 250–3.

ASSOCIATION'S ANNUAL MEETING

THE American Genetic Association will hold its thirteenth annual meeting in New York City, December 26–30, in connection with the American Association for the Advancement of Science. All sessions will be held at Columbia University.

The full program, with the time and place of all sessions, will be issued about December 15, and may be obtained by application to the secretary, 511 Eleventh Street N.W., Washington, D. C.; or after Christmas at the headquarters of the A. G. A. in New York, Hotel McAlpine; or at the New York headquarters of the A. A. A. S., Hotel Belmont.

The opening session will be on Tuesday afternoon, December 26, at 2.30 p. m. The title of the presidential address is "The Importance of Photographs in Presenting Genetic Discoveries." A motion picture entitled "How Life Begins," produced by George E. Stone, of the University of California, in collaboration with Dr. J. A. Long, will be shown through the courtesy of the Exhibitor's Booking Agency. It is said to be the most successful film yet produced, in showing the processes of reproduction and embryology.

Sessions will be held, probably by sections, both morning and afternoon of Wednesday, December 27. A section meeting may be held Thursday morning, December 28. Any other meetings will be joint ones, which will not conflict with other biological societies.

As all the hotels of New York City are certain to be crowded, members who desire reservations should make them at once.

The following titles of papers have already been submitted:

W. S. Anderson, Lexington, Ky.: Some difficulties in breeding blooded stock.

E. E. Barker, Ithaca, N. Y.: The Present status of instruction in genetics.

Roswell H. Johnson, Pittsburgh, Pa.: The eugenic aspect of sexual immorality.

D. F. Jones, New Haven, Conn.: The effect of heterozygosis upon the time of maturity.

J. H. Kempton, Washington, D. C.: The effects of selection on aleurone color in maize.

E. W. Moore, Ithaca, N. Y.: Studies in self-sterility.

Robert T. Morris, New York City: Notes on the hybridizing of nut trees.

J. B. Norton, Washington, D. C.: Asparagus breeding.

F. H. Pike, New York City: The biological significance of death.

Mary L. Read, New York City: Eugenics and the education of young women.

A. D. Shamel, Riverside, Cal.: Bud variation and selection in lemons.

Robert J. Sprague, Amherst, Mass.: The constructive aspect of birth control.

Adolph E. Waller, Columbus, Ohio: Xenia and other influences following fertilization.

Robert De C. Ward, Cambridge, Mass.: The war in relation to eugenics—a problem for the United States.

Frederick Adams Woods, Brookline, Mass.: Significant evidence for mental heredity.

Others who expect to present papers are Prof. W. E. Castle, of Harvard; Williams Haynes, Northampton, Mass.; Prof. Albert E. Jenks, of the University of Minnesota. Dr. A. J. Rosanoff, director of the Nassau County (Long Island) survey, will report on that important investigation, if the work of compiling the results is finished by that time.

Other members who desire to present papers should communicate with the secretary at once.

The meetings of the association will be open to the public, as usual.

Genetics Literature

THE annual reports of the AMERICAN BREEDERS' ASSOCIATION, published in seven volumes, form the most valuable collection of material for students of genetics which has been published in the United States. Most of them are out of print and are becoming very valuable. All of them are nearly indispensable to libraries, institutions and students of plant and animal breeding, heredity, variation, eugenics, or genetics in general.

The Association still has on hand a limited number of copies of three of these reports, which it offers for sale.

Vol. VI, Proceedings A. B. A. (1910), contains 465 pages. Illustrated. It includes 80 papers on general genetic subjects, and among the contributors are practically all the leaders in this study in the United States. **Issued at $2, now offered for $1.**

Vol. VII, Proceedings A. B. A. (1911), and Vol. VIII (1912), bound in one volume of 593 pages, illustrated, and including 73 monographs on the most vital and interesting features of genetics. **Issued at $3, now offered for $1.50.**

The volumes are substantially bound in cloth and will be sent post-paid on receipt of price.

As the Association frequently receives requests for other volumes of the proceedings, which are now out of print, it will be glad to hear from those who have copies for sale or exchange.

In addition to its annual reports, the Association still has on hand a few copies of the following issues of the AMERICAN BREEDERS' MAGAZINE:

Vol. I, Nos. 2 and 4.
Vol. II, Nos. 3 and 4.
Vol. III, No. 2.
Vol. IV, Nos. 1 and 4.

JOURNAL OF HEREDITY:

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